

Original Article

EVALUATION OF INCIDENCE OF MALIGNANCY IN SOLITARY THYROID NODULE AT A TERTIARY CARE HOSPITAL

MOHAMMAD NOOR ALAM¹, VIJAY LAXMI DULANGE², SADIA AFREEN S. ALAM³, PRAMOD⁴

^{1,2,4}Department of General Surgery, GIMS, Kalaburgi, Karnataka, India. ³Medical Oncology Resident, S. L. Raheja Hospital, Mumbai, India
Email: dr.pramodmala@gmail.com

Received: 11 Feb 2023, Revised and Accepted: 14 Mar 2023

ABSTRACT

Objective: This study aims to identify the incidence of malignancy in solitary nodule thyroid in a tertiary care hospital in Kalaburagi, Karnataka.

Methods: This was a prospective non-randomized hospital-based interventional study carried out on 50 patients over a period of 1 y, who presented with clinically palpable solitary thyroid swellings and subsequently underwent surgery for the same at the Department of General Surgery, Gulbarga Institute of Medical Sciences, Kalaburagi, Karnataka.

Results: Over the total duration of the study period, there were 50 cases of clinically detected solitary thyroid nodule with a high female preponderance. The mean age of the incidence of solitary thyroid nodule was 40.6 y. The incidence of malignancy in solitary thyroid nodule was found to be 18%.

Conclusion: It is concluded from the present study that 18% of solitary thyroid nodules are malignant, with female preponderance and a mean age of solitary thyroid nodule is 40.62 y.

Keywords: Malignancy, Age and Sex, Solitary thyroid nodule

© 2023 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>)
DOI: <https://dx.doi.org/10.22159/ijpps.2023v15i5.47538>. Journal homepage: <https://innovareacademics.in/journals/index.php/ijpps>.

INTRODUCTION

Patients presenting to the surgical outpatient department with a solitary nodule in the Thyroid gland are quite common. Incidence of a clinically palpable nodule in the thyroid gland in the adult population stands at approximately 8%. With recent advances in diagnostic imaging techniques, especially high-resolution ultrasonography (HRUSG), the rate of detection of even clinically impalpable thyroid nodules have increased many folds [1].

The prevalence of nodules in the thyroid gland increases to up to 50% when the clinical examination is combined with HRUSG [2].

A Thyroid nodule is traditionally defined as a 'palpable lesion or a lesion radiologically distinct from the surrounding normal parenchyma of the gland'. Depending on the number, the nodules are classified as either solitary or multiple [3].

Furthermore, Solitary nodules can either be an exclusively single nodule or it can be a dominant nodule in a multinodular gland in which the other smaller nodules are clinically impalpable [4].

Pathologically, the presenting lesions can range from being benign to being malignant. Benign nodules can have multiple etiologies like simple cysts, thyroid adenoma or colloid nodules. Malignant nodules, on the other hand, can include papillary carcinoma, follicular carcinoma, medullary carcinoma or secondary from other sites [5].

Since Solitary thyroid nodules are a common occurrence, the risk of malignancy in these nodules has to be borne in the surgeon's mind while dealing with it either non-operatively or surgically.

Thus, the identification of patients with a significant risk of malignancy is a must and evidence-based guidelines needs to be followed for the management of these patients [6].

The incidence of thyroid cancer in general population with thyroid nodules, ranges from 5-20%, where as in population who are exposed to ionizing radiation is more (18-30%) [7].

Therefore, an exhaustive pre-operative work-up of the swelling becomes the need of the hour to create the precise distinction

between benign and malignant swellings. With the advances in imaging and tissue sampling modalities, it has become comparatively easier to arrive at a reliable pre-operative diagnosis and thereby helps in avoiding unnecessary extensive surgery [8, 9].

This study was conducted over a period of 6 mo in a tertiary care hospital in Kalaburagi, Karnataka, India, aiming to evaluate the incidence of malignancy in Solitary thyroid nodules operated in our hospital and also to study the age and gender predispositions seen in such swellings.

MATERIALS AND METHODS

Methods

This was a prospective non-randomized hospital-based interventional study carried out on 50 patients who presented with complaints of Solitary thyroid swelling and subsequently underwent surgery for same at a tertiary care hospital. The study was conducted for a period of 6 mo from January 2022 to June 2022. The Institutional Ethics Committee (ECR/889/Inst./2017) approval was obtained at the beginning of the study. The patients presenting with a clinically palpable solitary thyroid nodule between 10 to 65 y of age of both gender were included in the study. And the patients with non-solitary thyroid swellings i. e clinically, radiologically and surgically proven multinodular goiter, patients not consenting for the interventions, previously operated patients with recurrent thyroid swellings, patients with a history of radiation exposure, and pregnant females were excluded from the study.

After applying inclusion and exclusion criteria, 50 patients were selected to be included in the study. Informed Consent was taken from all the included patients by explaining about the study in the local kannada language. The data was collected regarding history of presentation of the swelling and relevant history to trace the etiological causative factors of the swelling. Additionally, a history of any previous surgeries, history of any co-morbidities, any positive family history, and drug history were obtained and documented. All the study participants were subjected to thorough general physical examination, complete systemic examination and in-depth thyroid examination and same was documented in the performa.

Additionally, baseline routine pre-operative work-up as well as specific investigations like thyroid function tests, fine needle aspiration biopsy (FNAB), X-ray of the neck, anteroposterior and lateral views to look for retrosternal extension in larger swellings, HRUSG of the neck and indirect laryngoscopy to ascertain the condition of the vocal cords were performed.

A euthyroid state was achieved in all patients by appropriate medical therapy before undergoing surgery. As a criterion for inclusion, a solitary thyroid nodule was defined as a “single swelling involving either lobe of the gland or isthmus of the gland and with no features of multi-nodularity detected either clinically, radiologically or postoperatively on histopathology”.

All Patients underwent surgery by the same team of 2 surgeons and the operated specimen was sent for histopathological examination. The histopathological reports were subsequently evaluated and correlated with the pre-operative clinical diagnosis by standard statistical methods. The data were analyzed using descriptive

statistics using Microsoft Excel software and the results were depicted in frequency and percentage.

RESULTS

This study was conducted on 50 patients who presented to the Department of Surgery with Solitary thyroid nodule.

A standard proforma was designed to collect the data such as clinical presentation, investigation findings, an operative procedure performed and histopathological findings and analysis was performed using descriptive statistics. The following observations were made from the current study.

The youngest participant in the study was 12 y of age and the oldest participant was of 65 y. The mean age of patients was found to be 40.62 y, with the highest prevalence of solitary thyroid nodules observed in the age group of 41-50 y (fig. 1).

More females (42) were found to be affected than males (8) (fig. 2).

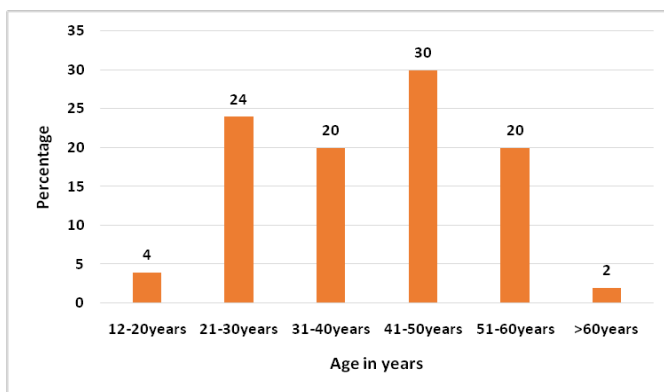


Fig. 1: Age distribution of solitary thyroid nodule

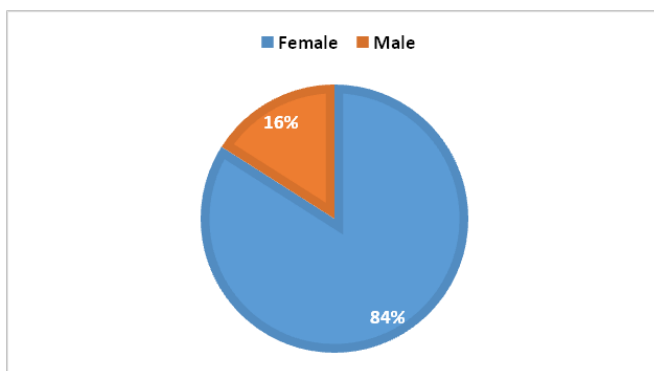


Fig. 2: Gender distribution of solitary thyroid nodule

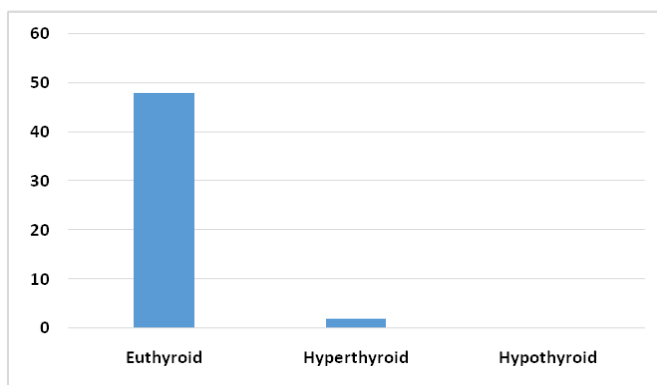


Fig. 3: Thyroid profile of the patients

Table 1: Diagnosis of thyroid nodules

Diagnosis	Number of cases	Percentage
Benign	41	82%
Malignant	9	18%
Total	50	100%

In our study series, 41 patients (82% of sample) had benign nodules, with 9 patients (18% of sample) were diagnosed with malignancy (table 1).

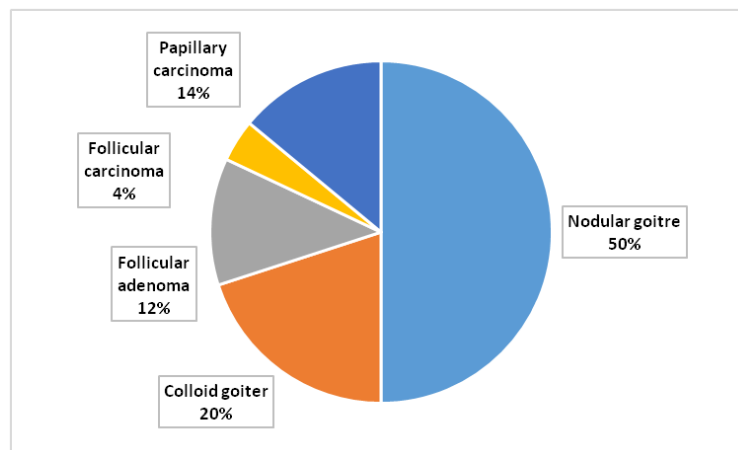
Out of the 50 subjects included in the study, malignancy was detected in 9 patients and papillary carcinoma of thyroid was found to be the most common malignancy occurring in the Solitary Thyroid nodules accounting for 7 of the total of 9

malignancies. Out of these 9 patients, 8 were females. Thus, malignancy was also found to be more prevalent in the female gender (table 2).

Fig. 3 shows the histopathological diagnosis of the patients, in which 50% of the cases are found to be nodular goiter, followed by 20% of Colloid Goiter, 14% of papillary carcinoma, 12% of follicular goitre and 4% follicular carcinoma (fig. 4).

Table 2: Gender-wise distribution of malignancy

Type of malignancy	Males	Females
Follicular Carcinoma	0	2
Papillary Carcinoma	1	6
Total	1	8

**Fig. 4: Histopathological diagnosis**

DISCUSSION

Although majority of solitary nodules are benign, the risk of malignancy cannot be ignored which will present a significant challenge to the surgeons. Because, according to recent studies, the incidence rate of thyroid malignancy in patients with a palpable solitary nodule lies in the range of 11-20% [11, 12].

Table 3 shows the comparison of incidence of Malignancy in solitary thyroid nodule with other studies [13-16].

Table 3: Comparison of incidence of malignancy in solitary thyroid nodule with other studies

Studies	Incidence rate
The present study	18%
Fenn <i>et al.</i> [13]	12%
Bhansali SK <i>et al.</i> [14]	09%
Rehman AU <i>et al.</i> [15]	11%
Naz Akhtar <i>et al.</i> [16]	15.3%

Historically, surgeons would perform routine surgical removal for every solitary thyroid nodule, but such a radical approach led to a tricky conundrum wherein many patients underwent unnecessary surgery for a STN that later turned out to be a benign lesion on histopathological examination.

Through the passage of time and with advancements in diagnostic modalities, it was realized that the need of the hour was to chart out a more selective surgical algorithm for patients with solitary thyroid nodules. For the same reason, at present, fine needle aspiration cytology (FNAC) has attained widespread acceptance as a quick, easy and reliable armament in the surgeon's army for the diagnostic workup of solitary nodules of the thyroid gland.

In their Series of 299 patients with STN at the time of surgery, Veith FJ, Brooks JR, Grigsby WP, *et al.* (1964) reported the female-to-male ratio to be 5:1 with papillary carcinoma being the predominant malignancy among them [17].

In his study on the surgical and histopathological data of 172 patients operated for solitary thyroid nodules, Khairy GA reported 13.9% incidence of malignancy, wherein papillary type made up for the majority [18].

In our study, after final histopathological examination, 9 of the 50 STN were found to be malignant with papillary carcinoma found to be the most frequent diagnosis (with 7 out of the 9 cases being diagnosed with it). The remaining 2 were follicular carcinoma.

The highest numbers of thyroid nodules were seen in the age group of 41-50 y; the mean age of patients was 40.62 y. The patients were spread across the age group with the youngest being of 12 y age and the eldest being 65 y old.

The pattern of age distribution assumes a major significance because the incidence of malignancy in STN has been quite frequently observed to be high at the extremes of ages.

It therefore goes without saying that the patients presenting with STN who are either younger than 20 y or older than 50 y have to be evaluated with high degree of clinical suspicion. It would be safer to assume all STNs occurring at the extreme of ages to be malignant until confirmed histopathologically.

In their study, Akhtar N *et al.* noted that 42.7% of the patients were between 31-40 y. Incidence of malignancy in STNs was recorded to be at 15.3% [16].

Hossain MA *et al.*, reported male to female ratio of 1:7 and the 31-40 age group had the greatest number of patients with STN (12). Additionally, 28% of the patients had malignant lesions in their study [19].

In their study on the incidence of malignancy in solitary nodule of thyroid, Babu R *et al.* (2015) reported the female-male ratio to be 8:1. The peak age incidence was found to be in the 21-30 y age group with the incidence of malignancy being at 10.83% [20].

The present study has the limitation of smaller sample size and it is a single-center study. Furthermore, we had included only solitary types of nodules, excluding multinodular goiter. The present study provides baseline information for conducting future studies in a larger sample and including multinodular goiter at multiple centres.

CONCLUSION

From this study, done at a tertiary care hospital in Kalaburagi, Karnataka, we have drawn the conclusion that 18% of solitary thyroid nodules were observed to be malignant, and the incidence of malignancy was found to be 5 times greater in females than in males (5.2: 1) and a mean age of presentation of patients with solitary thyroid nodule was 40.62 y.

ACKNOWLEDGEMENT

The authors would like to acknowledge the support of Dept. of Surgery, Gulbarga Institute of Medical Sciences.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All the authors Dr. Mohammad Noor Alam, Dr. Vijaylaxmi Dulange, Dr. Sadia Afreen S Alam and Dr. Pramod, have equally made a substantial contribution in the conception, acquisition of data, interpretation of data, and in drafting the article and agreed to be held accountable for all aspects of the work.

CONFLICT OF INTERESTS

There was no conflict of interest in this work.

REFERENCES

- Palani V, Reshma S. A clinical study of incidence of malignancy in solitary thyroid nodule in a tertiary care hospital. *Int Surg J.* 2019;6(1):293-5.
- Yeung MJ, Serpell JW. Management of the solitary thyroid nodule. *Oncologist.* 2008 Feb;13(2):105-12. doi: 10.1634/theoncologist.2007-0212, PMID 18305054.
- Papini E, Monpeyssen H, Frasoldati A, Hegedüs L. European Thyroid Association clinical practice guideline for the use of image-guided ablation in benign thyroid nodules. *Eur Thyroid J.* 2020;9(4):172-85. doi: 10.1159/000508484, PMID 32903999.

- Tai JD, Yang JL, Wu SC, Wang BW, Chang CJ. Risk factors for malignancy in patients with solitary thyroid nodules and their impact on the management. *J Cancer Res Ther.* 2012 Jul 1;8(3):379-83. doi: 10.4103/0973-1482.103516, PMID 23174718.
- Unnikrishnan AG, Kalra S, Baruah M, Nair G, Nair V, Bantwal G. Endocrine Society of India management guidelines for patients with thyroid nodules: a position statement. *Indian J Endocrinol Metab.* 2011 Jan;15(1):2-8. doi: 10.4103/2230-8210.77566, PMID 21584159.
- Usha Menon V, Sundaram KR, Unnikrishnan AG, Jayakumar RV, Nair V, Kumar H. High prevalence of undetected thyroid disorders in an iodine sufficient adult south Indian population. *J Indian Med Assoc.* 2009 Feb 1;107(2):72-7. PMID 19585813.
- Reena N, Megha G, Jyoti C, Chawda H, Manoj KM. Estimation of the cytomorphological spectrum of thyroid lesions by fine-needle aspiration cytology based on Bethesda system for reporting in tertiary care hospital. *Asian J Pharm Clin Res.* 2022;15(10):134-6.
- Davies L, Welch HG. Increasing incidence of thyroid cancer in the United States, 1973-2002. *JAMA.* 2006 May 10;295(18):2164-7. doi: 10.1001/jama.295.18.2164, PMID 16684987.
- Cole WH, Majarakis JD, Slaughter DP. Incidence of carcinoma of the thyroid in nodular goiter. *J Clin Endocrinol Metab.* 1949 Oct 1;9(10):1007-11. doi: 10.1210/jcem-9-10-1007, PMID 18142433.
- Gupta M, Gupta S, Gupta VB. Correlation of fine needle aspiration cytology with histopathology in the diagnosis of solitary thyroid nodule. *J Thyroid Res.* 2010 Apr 18;2010:379051. doi: 10.4061/2010/379051, PMID 21048838.
- Anitha S, Ravimohan TR. A study of incidence of malignancy in solitary nodule of the thyroid. *J Contemp Res.* 2016;3(4):993-5.
- Aggarwal SK, Jayaram GI, Kakar AR, Goel GD, Prakash RA, Pant CS. Fine needle aspiration cytologic diagnosis of the solitary cold thyroid nodule. Comparison with ultrasonography, radionuclide perfusion study and xeroradiography. *Acta Cytol.* 1989 Jan 1;33(1):41-7. PMID 2644743.
- Fenn AS. Solitary nodule of thyroid gland. *Ind J Surg.* 1980;42:175-1.
- Bhansali SK. Solitary nodule in thyroid gland. *Indian J Surg.* 1982;55:547.
- Rehman AU, Lodhi S, Anwar MI. Histopathological evaluation of 432 cases of goiter. *Ann King Edward Med Univ.* 2009;15(2):54.
- Musthafa SM, DSAM, Daniel R, Rai R, Vallal DP, Reddy ML. Clinical and histopathological profile of the patient with solitary thyroid nodule in tertiary care hospital in South India. *J Evol Med Dent Sci.* 2017 Nov 13;6(89):6196-9. doi: 10.14260/jemds/2017/1347.
- Veith FJ, Brooks JR, Grigsby WP, Selenkow HA. The nodular thyroid gland and cancer. A practical approach to the problem. *N Engl J Med.* 1964 Feb 27;270(9):431-6. doi: 10.1056/NEJM196402272700901, PMID 14163220.
- Khairy GA. Solitary thyroid nodule: the risk of cancer and the extent of surgical therapy. *East Afr Med J.* 2004 Nov 17;81(9):459-62. doi: 10.4314/eamj.v81i9.9221, PMID 15626055.
- Hossain MA, Sarkar MZ, Dutta UK, Karim MA, Alam MZ. Frequency of malignancy in solitary thyroid nodule and multinodular goitre. *Bangladesh J Orl.* 2014;20(2):55-9. doi: 10.3329/bjo.v20i2.22019.
- Babu R, Shyamala M, Reddy SK. Malignant incidence in solitary nodule thyroid-a clinical study. *IJAR.* 2015;5(2).