

## Evaluation of Solitary Thyroid Nodule at Nuclear Medicine Centre Dinajpur – Our Initial Experience

\*Bose BK,<sup>1</sup> Rimi KR,<sup>2</sup> Ahsan Kamrul,<sup>3</sup> Talukder SI<sup>4</sup>

Nodular enlargement of the thyroid is detectable by palpation in 4%-7% of adult population. Palpable thyroid nodules are more common in iodine deficient geographic areas than in areas of the world with sufficient intake of iodine. Solitary Thyroid nodule is four time more likely to develop in women than men. 85-90% of Thyroid nodules are benign but the presence of a thyroid nodule warrants follow up and further testing for malignancy. Clinical examination, thyroid ultrasonography, scanning and FNAC are the main methods to evaluate solitary thyroid nodule. In a peripheral Nuclear Medicine Centre in northern part of Bangladesh where iodine deficiency is high, 52 solitary thyroid nodule were evaluated in one year. Among them 36 were female, 16 were male (2.3:1). Mean age were 38.10±12.4 SD. In Ultrasound, 31 were solid nodule, 12 were cystic and 1 was mixed. In radio nuclide thyroid scanning cold nodules were 45 (86.54%), hot nodule, were 7 (13.46%). In FNAC 45 cold nodules were evaluated, among them 13 were colloid nodule, 10 (19.23%) thyroid cyst, 7 cases were thyroiditis, 5 cases were follicular adenoma and thyroid malignancy were found is 10 (19.23%) Cases of which 6 were papillary carcinoma, 4 were follicular carcinoma. Incidence of malignancy is cold nodule were 22.22% and in solid nodule were 32.25% in our study. Further large scale study should be carried out to evaluate the incidence of malignancy is solitary thyroid nodule.

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**Key words:** Solitary thyroid nodule

### Introduction

**T**hyroid disorder may occur with or without diffuse or nodular enlargement of the thyroid gland. The most common endocrine disorder in the world today is nodular goitre.<sup>1</sup> In the United States, the prevalence of nodular thyroid disorder has been reported to be 4-7%.<sup>2</sup> Prevalence increases linearly with age, exposure to ionizing radiation and iodine deficiency. Thyroid nodules are more common in women than in men. More than two-thirds of the nodules are solitary.<sup>3</sup> Thyroid nodules are

evaluated because they may be malignant, can cause hyperthyroidism or can cause local compressive symptoms. Solitary thyroid nodule is most often a colloid nodule or benign adenoma and may be cyst, thyroiditis, primary or metastatic cancer. The incidence of malignancy in solitary thyroid nodule ranges from 10-20% in different series.<sup>4</sup> There are regional differences in the prevalence of solitary nodule. This study was performed to identify different type of solitary thyroid nodule and to assess their relative frequency in this region.

1. \*Dr. B. K. Bose, Director, Centre for Nuclear Medicine and ultrasound., Dinajpur. email: bkbosed@yahoo.co.in
2. Dr. Kanta Roy Rimi, Associate Professor, Department of Anatomy, Dinajpur Medical College.
3. Dr. Md. Kamrul Ahsan, Assistant Professor, Department of Ortho-surgery, Dinajpur Medical College
4. Dr. Md. Sadequel Islam Talukder, Assistant Professor, Department of Pathology, Dinajpur Medical College.

\*For correspondence

## Methods

From January 2010 to December 2010 fifty two (52) patients who presented with clinically detected solitary thyroid nodule at Nuclear Medicine Centre, Dinajpur were studied. Detail history was taken and physical examination was done. The clinically solitary thyroid nodule was defined as a goitre, which on clinical examination appeared to be a single nodule in an otherwise normal gland. Sonographic examination of thyroid was done by ultrasonograph equipped with a 10.5 MHz linear probe. Thyroid scintigraphy was performed by a Thyroid Scanner 20 minutes after an intravenous injection of 3mCi Tc<sup>99m</sup> pertechnetate. With aseptic technique fine needle aspiration cytology were performed in all cold nodules by pathologist. In our study protocol no FNAC was done in any patient with hot nodules.

## Results

Of the total 52 cases in this study, 36 were female and 16 male with female to male ratio being 2.3:1 The mean age of the patient was  $38.10 \pm 12.44$  SD years (range 16 – 65 years). The age and sex distribution of the patient is shown in Table I.

Table I: The age and sex distribution of the patients.

Age Groups (years)	Number	
	Male	Female
16-25	2	4
26-35	6	16
36-45	4	5
46-55	2	6
56-65	2	5

The maximum number of patients belongs to 26-35 years age group (22, 42.31%). Nodules were classified into solid, cystic and mixed (solid with cystic areas) based on ultrasonogram findings. Thirty one patients were having solid nodules of which 25 nodules were cold on scan and 6 were hot, 12

cases were having cystic nodules and all were cold on scan, 9 cases were having mixed nodules of which 8 were cold on scan 1 were hot.

The incidence of cold and hot was 86.54% and 13.46% respectively. Results of ultrasonography and radionuclide scan are shown in Table II.

Table II: Results of ultrasonography and scintigraphy of thyroid nodule.

Types	USG	Scan	
		Cold	Hot
Solid	31	25	6
Cystic	12	12	0
Mixed	9	8	1

In FNAC all 45 cold nodules were evaluated by FNAC. Colloid nodules were the commonest 13(28.88%), followed by 10 (22.22%) cases of thyroid cyst, 7(15.56%) cases of thyroiditis, 5 (11.1%) cases of follicular adenoma. Thyroid malignancy was found in 10 cases (19.23%) including 6 papillary carcinoma, 4 follicular carcinoma. The incidence of malignancy in cold nodule was 22.22% and in solid nodule 32.25%.

## Discussion

Nodular thyroid disease is a form of thyroid disorder, which can present as a single nodule or multiple palpable nodule. Autopsy studies and ultrasonography series suggest that 40% - 50% of population have solitary or multiple nodules. The frequency of thyroid nodules increases through out life. The estimated life time risk of developing a palpable nodule is about 5-10%.<sup>5</sup> Most nodules are asymptomatic and benign, but some are malignant. Nodules are most likely to be malignant in patients younger than 20 years of age and older than 60 years.<sup>6</sup> Thyroid nodules are more common in Female but 2 times more likely to be malignant in male.<sup>7</sup> The important aspect in the evaluation of thyroid nodule is to determine whether it is benign or malignant,

so that unnecessary surgery can be avoided in the majority of the patients who have benign lesion.

Thyroid ultrasonography, scintigraphy and FNAC have been the main investigation used to identify thyroid nodules. Ultrasound has an important role to assess the nodularity of a thyroid gland, the anatomical relationship of thyroid tumour to large vessels in the neck and cervical lymph node metastasis. High resolution ultrasonography can determine thyroid nodule as small as 2 to 4 mm. In this study, 31 cases had solid nodule, 12 were cystic nodules and 9 were mixed nodule. Mixed nodules are predominantly solid with areas of cystic changes within the nodules.

The incidence of Malignancy in solid nodules is 32.25%, which is consistent with other studies. Cystic nodules constitute 19.23% in our study which is consistent with other study. Cystic lesions are generally regarded to be benign on repeated biopsy. The incidence of Malignancy accounts for only 1% of all cystic lesions.<sup>8</sup> In our study, no malignancy is seen in any cases of cystic nodules.

Thyroid scintigraphy provides information regarding the functional status of the nodule. The two most common isotopes used in scanning showed Tc-99m pertechnetate and radio-iodine (I-131) classifies nodules according to their ability to trap isotope. Studies showed that approximately 80-85% of solitary nodules are cold nodule. In our study 86.54% were cold nodule. This result is similar to other report.

FNAC is extremely valuable in the diagnosis and management of solitary thyroid nodule but the procedure is highly operator dependent. FNAC may be misleading when there is a sampling error and such errors can occur in cystic lesions larger than 4 cm, lesions smaller than 1 cm and deep seated thyroid nodules. Sonographic mapping of the suspicious area prior to FNAC can minimize

this problem. Thyroid ultrasound was performed routinely in our patients prior to FNAC. The sensitivity of FNAC is 91.7%, the specificity is 94.6% and the accuracy is 93.4% in our study that is similar to other reports. In the present series, colloid nodule is the component form of solitary nodule, which is 28.88% that is close to other study. Iodine deficiency may be one of the important factors for pathogenesis of solitary thyroid nodules in this area. The incidence of malignancy in our study is 22.22% that is similar to other reports. Of these 6 were papillary carcinoma, 4 were follicular carcinoma.

### *Conclusion*

Early and proper evaluation of solitary thyroid nodule is important. Thyroid ultrasonography, scintigraphy and FNAC are simple, safe and non-invasive procedures and provide high accuracy for precise diagnosis of the nodules at the onset. These will help to identify patients with malignant disease and avoid surgical procedures in most that have benign diseases.

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