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MALIGNANCY IN SOLITARY THYROID NODULE

Objective:

To find out the relative frequency of the malignancy in cold solitary thyroid nodules with other solitary thyroid nodules.

Material & Methods :

One hundred patients with clinically and Ultrasonographically diagnosed solitary thyroid nodules in the Dept. of General Surgery and Otolaryngology – Head & Neck Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka were included in this study from January 2011 to December 2012. These patients underwent thyroid scan. Surgery ranging from lobectomy to total thyroidectomy was done based on the FNAC report. The surgical specimens were subjected to histopathological examination, the reports of which were tallied with the thyroid scan and ultrasound findings.

Results

Out of them, 52 percent of patients were in the third and fourth decades of life and 26 percent were in the second decade of life. Females were more affected than males, and female: male ratio was 2.1:1. Solitary thyroid nodule involved right lobe of thyroid in 60% and the left lobe in 32% patients. The thyroid scan revealed cold nodules in 72%, warm nodule in 25% and hot nodule in 3% patients. 60% of the nodules were solid, 28% cystic and mixed in the rest on ultrasonography. On histopathology, 56 percent were colloid nodule, 28 percent were adenoma and 16 percent were carcinoma. Among the 16 percent malignant patients, majority of the patients had their age between 21-48 years. 20.83% (15/71) of the cold nodules on histopathological examination were malignant while 3.57%(1/28) of the other nodules were malignant. The difference between the two groups was statistically significant.

Conclusion:

Solitary thyroid nodules carry more risk of being malignant, particularly if the patient is young and if the nodule is radio- isotopically cold.

Key words: Solitary Thyroid Nodule, Carcinoma.

INTRODUCTION:

A solitary thyroid nodule is defined as a single discrete mass of abnormal tissues in an otherwise normal thyroid gland¹. Thyroid nodule is probably one of the commonest endocrine problem in the world². In different studies, thyroid nodules were found in 4 to 7 percent of American adults. In a report from the Thyroid Clinic, IPGMR, Dhaka, 32.67 percent of all thyroid patients had solitary thyroid nodule³. The frequency of thyroid nodule increases throughout life. In a study, lifetime risk of developing a thyroid nodule was estimated 5 to 10 percent⁴. More than two-thirds of the nodules are solitary². Most of the solitary thyroid nodules are benign. The incidence of carcinoma varies in different series⁵. Malnutrition is one of the major health problems in Bangladesh. Endemic goiter is considered to be one of the main nutritional diseases. The whole country is endemic with varying intensity, the highest prevalence is found mainly in the northern districts of the country⁶.

Investigation have revealed that iodine deficiency is the main cause of goiter in Bangladesh⁷. In Bangladesh, goiter is prevalent in bank of river Januna, northern part of the country and also in hilly areas in Sylhet and Chittagong⁸. In adults, the process which ultimately leads to the development of multinodular goiter does not necessarily affect the whole gland from the beginning. In our clinical practice, we encounter nodular goiter either with solitary nodule or multiple nodules in different stages of development. It is a common knowledge that the solitary nodule when removed and studied, often is to be multinodular goiter. Autopsy studies show that more than 50 percent of adults have nodules, many less than 1 cm in diameter, impalpable and therefore occult. It has also been estimated that only 20 percent of single nodules found at autopsy were large to have been palpable by the clinicians. It is believed that solitary nodules probably represent a manifestation of endemic goiter.

The thyroid cancer is one percent of all malignancies of body. The incidence of carcinoma is relatively small as compared to benign lesions of the thyroid gland. The reported incidence of carcinoma in solitary nodules varies from 2 to 20 percent⁹. The purpose of this study was to find out the relative frequency of the malignancy in cold solitary thyroid nodules with other solitary thyroid nodules (hot and warm).

MATERIALS AND METHODS:

This prospective study was carried out in the Department of General Surgery and Otolaryngology – Head & Neck Surgery, Bangabandhu

Sheikh Mujib Medical University (BSMMU), Dhaka during the period from January 2011 to December 2012.

One hundred cases with clinically solitary thyroid nodules admitted in the General surgery & ENT units of BSMMU during the above study period were included in this study. A solitary nodule was diagnosed when a goiter, on clinical examination, appeared to be single nodule in an otherwise normal gland¹⁴. The thyroid status of these patients was assessed clinically and by radioiodine tests. Fine-needle aspiration cytology (FNAC) was performed in every case. Ultrasonography was done in all cases to exclude multiple nodules and also to see consistency. Lobectomy was performed in most of the patients who were found to have a single nodule at operation. Total thyroidectomy was performed in almost all malignant cases according to FNAC report. Only the histopathologically proven cases were taken as malignant cases and were followed up. The histopathological reports were tallied with the ultrasound and thyroid scan findings.

RESULTS:

Table 1 shows the age and sex distribution of the patients. Out of 100 patients, 32 (32%) were male, age ranging from 16 to 45 years, and 68 (68%) were females, age ranging from 14 to 74 years. In both sexes, the largest age group was 21 to 40 years. In this series, male-female ratio was 1:2.1.

Tab.1: Age and Sex distribution of patients (n=100)

| Age group (years) | Male | | Female | | Total | |
|-------------------|------|---------|--------|---------|-------|----------|
| | No. | % | No. | % | No. | % |
| 1-20 | 8 | (25.00) | 18 | (26.47) | 26 | (26.0) |
| 21-40 | 14 | (43.75) | 38 | (55.88) | 52 | (52.0) |
| 41-60 | 10 | (31.25) | 10 | (14.71) | 20 | (20.0) |
| 60+ | 0 | | 2 | (2.94) | 2 | (2.0) |
| Total | 32 | (32.00) | 68 | (68.00) | 100 | (100.00) |

Radioactive iodine (I^{131}) uptake and scanning were done in all cases. The reading of uptake was taken at 2 hours, 24 hours and 48 hours in all cases. The normal value of uptake of radioactive iodine (I^{131}) at 2

hours was 5 to 15%, at 24 hours was 25 to 45% and at 48 hours was 60-85%. In 72 patients, the radioiodine uptake were low, both at 2 hours and 24 hours (<2% and <20%, respectively). In 25 patients, the radioiodine uptakes were normal and in 3 patients, the uptake was high (Table 2). The thyroid scan revealed 72 cold nodules and 25 warm nodules. Only 3 hot nodules were found (Table 3). A nodule was designated as cold when its radioiodine uptake was low or none; or warm nodule, when its uptake was the same as the rest of the gland; and as hot, when it concentrated more radioiodine than the rest of the gland.

Tab. 2 : Findings of radioactive iodine uptake (n=100)

| Findings | Number of patients | Percentage |
|----------|--------------------|------------|
| Normal | 25 | 25.0 |
| Low | 72 | 72.0 |
| High | 3 | 3.0 |

Tab. 3 : Results of thyroid scan (n=100)

| Types of nodule | Number of patients | Percentage |
|-----------------|--------------------|------------|
| Cold nodule | 72 | 72.0 |
| Warm nodule | 25 | 25.0 |
| Hot nodule | 3 | 3.0 |

Tab. 4 : FNAC report of thyroid gland (n = 100)

| FNAC reports | Number of patients | Percentage |
|----------------|--------------------|------------|
| Malignancy | 16 | 16.0 |
| Colloid goiter | 76 | 76.0 |
| Inflammatory | 8 | 8.0 |

In fine-needle aspiration cytology (FNAC), 76 percent patients showed colloid goiter, 16 percent malignancy and 8 percent inflammatory (Table 4). Ultrasonographic studies shows that 60 percent were solid, 28 percent cystic and the rest 12 percent mixed (Table 5).

Tab. 5: Ultrasonographic findings of solitary nodule (n=100)

| Consistency | Number of patients | Percentage |
|-----------------------|--------------------|------------|
| Solid | 60 | 60.0 |
| Systic | 28 | 28.0 |
| Mixed(Solid + cystic) | 12 | 12.0 |

In this series, all the patients were treated surgically. Table 6 shows the type of operations performed in different cases.

Tab. 6 : Types of surgical intervention (n = 100)

| Type of operation | Number of patients | Percentage |
|------------------------|--------------------|------------|
| Total thyroidectomy | 16 | 16.0 |
| Subtotal thyroidectomy | 3 | 3.0 |
| Hemithyroidectomy | 81 | 81.0 |

Tab. 7 : Histological types of clinical solitary nodules (n=100)

| Microscopic diagnosis | No. of patients | Percentage |
|-------------------------|-----------------|------------|
| Colloid nodule | 54 | 54.0 |
| Adenoma | 28 | 28.0 |
| Carcinoma | 16 | 16.0 |
| Nonspecific thyroiditis | 2 | 2.0 |

Following operation, all the specimens were examined histopathologically. Table 7 shows the findings of the operated specimens and the incidence of different pathology. The most common microscopic diagnosis established in clinically solitary nodule was benign colloid nodule, accounting for 54 percent

of all lesion encountered. The next frequent diagnosis was adenoma found in 28 percent cases. Solitary nodule was malignant in 16 percent of cases. Nonspecific thyroiditis was found in 2 percent patients. Table 8 shows the histological types of thyroid malignancy. The papillary group comprised 50 percent of the total group. Table 9 shows the highest incidence of malignancy among cold solitary nodules (20.83) than other nodules (hot and warm) (3.57%). The difference was significant.

Tab. 8 : Histological types of thyroid cancer (n=16)

| Types | Female (n = 12) | | Male (n = 4) | | Total (n = 16) | |
|-------------------------|-----------------|---------|--------------|---------|----------------|---------|
| | No. | (%) | No. | (%) | No. | (%) |
| Papillary | 6 | (50.00) | 2 | (50.00) | 8 | (50.00) |
| Follicular | 3 | (25.00) | 1 | (25.00) | 4 | (25.00) |
| Papillary Follicular | 2 | (16.67) | 0 | | 2 | (12.50) |
| Anaplastic | 1 | (8.33) | 1 | (25.00) | 2 | (12.50) |

Tab. 9 : Comparison between incidence of malignancy in cold solitary nodule and other nodules (hot and warm)

| | Malignancy | |
|--|------------|------------|
| | Number | Percentage |
| Group I: Cold solitary nodule (n = 72) | 15 | (20.83) |
| Group II: Other nodules (hot and warm) (n = 28) | 1 | (3.57) |

Z test: Z = 2.91, P < 0.01 (significant)

DISCUSSION:

This study was carried out to find out clinical features in solitary thyroid nodule. The main objective was to find out the incidence of malignancy in solitary thyroid nodules. Carcinoma of thyroid may be diagnosed in patients of all ages, but most cases are seen in the third to fifth decades¹¹. The 16 patients in whom malignancy was confirmed were within third to fourth decade. This result is similar to study of Farbota et al¹², Ott et al¹³ and Rains and Mann¹⁴. In our study, females were predominant (2.1:1). Thyroid carcinoma was more common in female which is similar in the studies¹⁵. Nodular goiter also common in females supported in other series¹⁶. In our present series, in 72 percent of the patients, radioiodine uptake was low. In 25 patients, radioiodine uptake was normal and in 3 of these, the uptake and turnover were also high. High uptake and high turnover are considered to be hyperthyroid. Results in this table are compatible with studies^{14,15}. In present series, after thyroid scan, 72 percent nodules were found 'cold', 25 percent 'warm' and 3 percent 'hot'. These results are consistent with the results⁷.

In current study, according to FNAC reports, 76 percent showed colloid materials (colloid goitre) and 16 percent showed malignant cells (malignancy). These results are quite similar with other series^{16,17,18}. In our series, ultrasonographic findings showed 60 percent solid, 28 percent cystic. This result is compatible with studies^{12,19}. In this series, all the patients were treated surgically and followed by thyroxine therapy. Hemithyroidectomy were also done. Total thyroidectomy was also performed in all malignant cases, which is similar to series^{14,20}.

Following operation, all the specimens were examined histologically. Histopathological findings were: colloid nodule in 54 percent cases, adenoma in 28 percent, carcinoma in 16 percent, which is similar with the results^{5,14,17}. The papillary group comprised majority (50%) of the total thyroid cancer group. This is quite similar with series^{19,21}. But in a study of Rains and Mann¹⁴ papillary carcinoma was found in 60 percent. The current study showed the comparison between incidence of malignancy in cold solitary nodule and other nodules (warm and hot). The result is similar with many series^{7,14,22}. The result was statistically analyzed by proportion test of 'Z' test, which is significant.

CONCLUSION:

It may be concluded from the present study that solitary thyroid nodules carry more risk of being malignant, particularly if the patient is young and if the nodule is radio-isotopically cold. Greater emphasis should be placed on FNAC, on which good training and expertise should be fostered on priority basis. Early and effective treatment for thyroid carcinoma may give good life-expectancy, also in some cases reduce the morbidity and mortality. Further studies involving large number of patients and a long-term follow-up are necessary to have more definite conclusion.

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