

Original Articles

Frequency & pattern of malignancy in solitary thyroid nodule

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Abstract:

This cross sectional study done in the department of Banghabandhu Sheikh Mujib Medical University and Dhaka Medical College Hospital during the period of July 2005 to October 2007 to determine frequency & pattern of malignancy in solitary thyroid nodule. For this study, 118 patients who were diagnosed as a case of malignancy in solitary thyroid nodule by detailed history, clinical examination, thyroid hormone assay, ultrasonogram, thyroid scan, FNAC and histopathological examination, were collected.

In this study majority of the patients were within 21-40 years of age . Frequency of solitary thyroid nodule is more in female with male female ratio 1: 2.11 Majority of the nodules were firm (72.03%), others were hard (16.95%) and cystic (11.02%). Malignant lesion was more common in hard nodule (70%). Most of the nodules were cold (66.10%) among them 25.6% cases were malignant, followed by warm (30.5%) and hot (3.3%). No malignancy was found in hot nodule. FNAC showed colloid nodule (44%), cellular follicular lesion (29.66%), papillary carcinoma (12.7%), colloid degeneration (4.2%) and medullary carcinoma (1.6%) Out of 118 patients, histopathologically non malignant were 96 (81.35%) and malignant were 22(18.65%). Among malignant cases, 16 (72.72%) cases were papillary carcinoma, 4 (18.18%) cases were follicular carcinoma and 2(9.1%) cases were medullary carcinoma.

Key words: Solitary thyroid nodule, FNAC, Papillary carcinoma, Follicular carcinoma

Introduction:

Thyroid swellings are common clinical problem throughout the world. These are also common clinical problem in Bangladesh. Most of thyroid swellings are multinodular, but a good percentage are solitary thyroid nodule. The solitary or isolated thyroid nodule may be defined as a discrete swelling in a otherwise impalpable gland. About 70% discrete thyroid swelling are clinically isolated. Thyroid nodules are common and are present 3-4% of the adult population in the UK and USA. They are 3-4 times more frequent in women than men. With ultrasonogram nodule may

be found upto 50% of population over 60 years of age. A nodule may be adenoma, cyst, multinodular goiter, thyroiditis and thyroid cancer.¹

The importance of solitary thyroid nodule lies in the significant risk of malignancy compared with other thyroid swelling. Incidence of malignancy within a clinically apparent solitary thyroid nodule is approximately 10%. In males 31% of nodules were malignant compared with 21% in female.² If imaging investigations shows the nodule to be truly solitary, then the likelihood of it being malignant increases to about 20%³, of which papillary carcinoma comprises about 80%, follicular carcinoma 10% and medullary carcinoma 5%³ but in another study it showed papillary carcinoma comprises about 60% and follicular carcinoma 18%.⁴

This study has been carried out to find out the relative frequency of pathological types, frequency and pattern of malignancy in solitary thyroid nodule and its age & sex variation.

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Methods

This cross sectional study was carried out in the department of Otolaryngology- Head and Neck Surgery of Bangbandhu Sheikh Mujib Medical University and Dhaka Medical College Hospital during the period of July 2005 to October 2007 to determine frequency & pattern of malignancy in solitary thyroid nodule. For this study 118 patients were collected who fulfilled the criteria of selection. Patients were diagnosed as a case of malignancy in solitary thyroid nodule by detailed history, clinical examination, thyroid hormone assay, ultra sonogram, thyroid scan, FNAC and histopathological examination. A standardized structured data collection instrument was used to collect necessary information of the study subject, which include: history of the patients: a relevant questionnaire was used as history sheet of patient, Clinical examination and histopathological findings of solitary thyroid nodule. After compiling the data, they had been arranged and presented in various table and figures. On the basis of these results the significance of the this study was tested statistically by using the chi-square test (χ^2) and Z test.

Results

In this study majority of the patients were within 21-40 years of age and mean age was 32.54±2.97. Frequency of solitary thyroid nodule is more in female with male female ratio 1: 2.11 but regarding malignancy in solitary thyroid nodule the ratio was 1: 1.75. Majority of the nodules were firm (72.03%), others were hard (16.95%) and cystic (11.02%). Malignant lesion was more common in hard nodule (70%). In this series most of the nodules were cold (66.10%) among them 25.6% cases were malignant, followed by warm (30.5%) and hot (3.3%). No malignancy was found in hot nodule. FNAC is highly accurate, minimally invasive preoperative diagnostic tool in this study which showed only 5.08% were non-conclusive but by it colloid nodule (44%), cellular follicular lesion (29.66%), papillary carcinoma (12.7%), colloid degeneration (4.2%) and medullary carcinoma (1.6%) is distinguished though it could not distinguish between follicular.

Table-I

Age distribution in relation to sex (n = 118).

Age (Year)	No of Patients	Male	Female	Male : Female
0-10	0	0	0	0:0
11-20	4	1	3	1:3
21-30	42	12	30	1:2.5
31-40	54	13	41	1:3.15
41-50	15	10	5	1:0.5
51-60	3	2	1	1: 0.5

$\chi^2 = 11.77, p 0.019 < 0.05.$

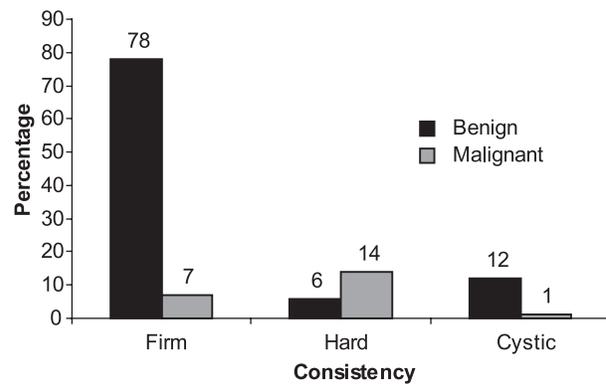


Fig-1: Consistency of nodule with relation of benign and malignant lesion (n=118)

Table-II

Radio isotope scan findings of solitary thyroid nodule (n=118).

Diagnosis	No of patient		Percentage (%)
	Benign	Malignant	
Cold	58	20	66.10
Warm	34	2	30.51
Hot	4	0	3.39
Total	96	22	100

Table-III

Fine needle aspiration cytology (FNAC) (n = 118).

Diagnosis	Diagnosis	No of patients	Percentage (%)
Neoplastic	Colloid degeneration	5	4.24
	Thyroiditis	3	2.54
	Cellular follicular lesion	35	29.66
Neoplastic	Papillary carcinoma	15	12.71
	Medullary carcinoma	2	1.69
	Non conclusive	6	5.08

Table-IV
Pattern of malignancy (n=22)

Type	No of cases	Percentage
Papillary	16	72.72
Follicular	4	18.18
Medullary	2	9.10

Table-V
Compare between FNAC and Histopathological finding.

Type	No of cases	Percentage
Papillary	16	72.72
Follicular	4	18.18
Medullary	2	9.10

Table-VI
Compare between FNAC and Histopathological finding.

FNAC →	Colloid Nodule		Colloid Degeneration	Cellular Follicular lesion	Thyroiditis	Papillary carcinoma	Non conclusive	Medullary carcinoma	Total
	HISTOPATHOLOGY ↓								
Nodular Goiter	52	5	0	0	0	0	5	0	62
Nodular Goiter with Thyroiditis	0	0	0	0	3	0	0	0	3
Follicular Adenoma				31					31
Papillary carcinoma	0	0	0	0	0	15	1	0	16
Follicular Carcinoma	0	0	0	4	0	0	0	0	4
Medullary carcinoma	0	0	0	0	0	0	0	2	2
Total	52	5	0	35	3	15	6	2	118

Adenoma with follicular lesion. Out of 118 patients, histopathologically non malignant were 96 (81.35%) and malignant, 22(18.65%) of which 8 (21.05%) out of 38 male and 14 (17.5%) out of 80 female. Among malignant cases, 16 (72.72%) cases were papillary.

Table-VII
Carcinoma in solitary thyroid nodule in relation to age and sex (n=22).

Age group	Male (n=8)		Female (n=14)	
	No of cases (n)	Percentage (%)	No of cases (n)	Percentage (%)
0-10	0	0	0	0
11-20	0	0	2	9.09
21-30	1	4.55	2	9.09
31-40	3	13.64	5	22.73
41-50	3	13.64	4	18.18
51-60	1	4.55	1	4.55

Carcinoma, 4 (18.18%) cases were follicular carcinoma and 2(9.1%) cases were medullary carcinoma.

Discussion

Carcinoma of the thyroid is the most common malignancy of endocrine system comprises 0.6% and 1.6% of all cases malignant neoplasm in men and women respectively⁵. The incidence of this malignancy has increasing over the last decade. The incidence of malignancy within a clinically solitary thyroid nodule is approximately 10%.³ In this series 118 patients with solitary thyroid nodule were studied and 22 cases were found malignant.

The age distribution in this series is more or less in general agreement with similar report in the literature.^{5,6} Highest number of patients were found in third and fourth decades as 55% nodules were colloid nodule which mostly occurred in these age group. The younger patient of this series was a girl of 14 years, a case of papillary carcinoma, the oldest patient was a lady of 58 years, a case of follicular carcinoma. The youngest and oldest patient of this series have been suffering from malignant disease. The extreme of ages shows less incidence of thyroid disease but more chance to be malignant⁶.

In this study out of 118 cases, 38 were male and 80 were female & Male to female ratio was 1: 2.11. The cause of high male to female ratio in this series can be explained by most of the patients are from nonendemic area.⁷ Here we may recall the findings of Kilopatric et al who found a female to male ratio of 4:1 in nonendemic area⁸. In this study male to female ratio was 1:2.11. About 68% of our patients were female and 32% male. It is due to fact that thyroid disorder is female prone⁹.

Regarding presenting complaints we have found that all of the patients with neck swelling presents within variable durations. Some patient also presented with other symptoms like cervical lymphadenopathy 6(5.08%) cases, dysphagia 2(1.69%), metastatic bony swelling (sternum) 1(.85%) case and hoarseness of voice 1(.85%) case. Among 22 malignant cases 20(91%) cases presented within 2 years but out of 96 benign cases only 40(41.66%) cases presented within 2 years. It is well supported by others studies.^{10,11}

Nodular goiter with large swelling may be associated with difficulty in respiration or rarely in deglutition which is due to pressure on trachea or oesophagus¹².

In this series we have seen that right lobe is slightly more affected than left lobe. There is yet no reported predilection for any specific site and no reason has

been put forward for such a predilection. We found 55 nodules in right lobe, 50 nodules in left lobe, 8 nodules in isthmus and 5 nodules in the junctional region between isthmus and one lobe.

Firm nodules are the commonest form of solitary thyroid nodule. In this series of solitary thyroid nodules constituted 72.03% firm, 16.95% hard and 11.02% cystic. Malignancy was found more in hard nodule 14(63.63%). It is almost similar to the study of Ascraft et al.⁸ Here hardness of nodule was due to malignancy and inflammatory conditions.

All solitary nodules are not a single clinical entity . So it is very difficult to comments regarding the nature of solitary nodule purely on the basis of clinical ground.¹² But hoarseness of voice, hard irregular nodule, palpable cervical lymphnode, extreme of age, male sex are always suspicious for malignancy in solitary thyroid nodule^{6,13}.

Investigations are essential to establish preoperative physical, function status and cytopathological nature of solitary nodule of thyroid¹³.

All patients of this study have done thyroid hormone profile and show value within normal limit. Isotopes scanning of the thyroid gland was done to see the functional status of the nodule. Most of the nodules were cold (66.10%). The incidence of cancer in cold nodule is highly variable; a review of 400 cases found 10% to be cancer.¹

In ultrasonography 85 nodules were solid, 18 were cystic and 15 were mixed. Ultrasonography is used to establish physical characteristics and to exclude clinically undetectable nodule of a dominant nodular goitre.¹²

Fine needle aspiration cytology (FNAC) is very important, highly sensitive and minimally invasive preoperative diagnostic tool¹². In this study 6 FNAC report were not conclusive. 112 FNAC reports were conclusive. FNAC can not distinguished between follicular adenoma and follicular carcinoma. FNAC diagnosis of this series was supported by postoperative histopathological report.

All the patients in this series were subjected to some form thyroid surgery. Operations were done according to site of involvement, nature of lesion and status of cervical lymphnode. Most of the operation for solitary thyroid nodule was done in the form of lobectomy which is supported by other studies.¹³

Final diagnosis in this study was on the basis of histopathological confirmation. Out of 118 cases, 65 cases (55.08%) were proven as nodular goitre which is compatible with other studies¹³.

Neoplastic lesion was found in 53 cases (44.92%) out of 118 cases. Out of all neoplastic cases 31(58.41%) was benign (follicular adenoma) and 22 (41.51%) cases were malignant. Malignancy was about 18.65% of all thyroid swelling. Incidence of cancer in solitary thyroid nodule was 23.7%². In this study among 22 malignant cases 16 (72.73%) were papillary carcinoma, 4(18.18%) were follicular carcinoma and 2(9.09%) cases were medullary carcinoma. It shows a clear predominance of papillary over follicular and medullary carcinoma. According to Watkinson, 2000, frequency of papillary carcinoma is 80% and follicular carcinoma is 10%. Shaheen, 1997 shows that papillary carcinoma comprises about 60% of all thyroid cancer and follicular carcinoma comprises 18% of all malignant thyroid neoplasm⁴.

Study showed very significant difference ($p < 0.01$) between papillary and follicular carcinoma, highly significant difference ($p < 0.001$) between papillary and medullary carcinoma. So, papillary carcinoma was more common among all thyroid malignancies in patients with solitary thyroid nodule.

As this study has been carried out over a limited period of time with a limited number of patients, it could not have been large enough to be of reasonable precision. All the facts and figures mentioned here may considerably vary from those of large series covering wide range of time, but still then, as the cases of this study are collected from a tertiary level hospitals in out country, this study has some credentials in reflecting the facts regarding distribution and type of malignancy in solitary thyroid nodule.

Conclusion:

In present series, good proportion of solitary thyroid nodule (18.65%) was malignant. So early diagnosis and proper management of the patient may reduce the morbidity and mortality.

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