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DOES THE CLINICAL ASSESSMENT HELP IN PREDICTING MALIGNANCY IN THYROID SWELLINGS?

Objectives:

To predict malignant nodules in solitary thyroid nodules on clinical assessment.

Materials and methods:

A total of 48 cases with thyroid nodule were clinically assessed in detail and underwent the standard thyroid surgery at BPKIHS, Dharan during the period of one year (April 2012 to march 2013).

Results:

The mean age was 41.42 years with female to male ratio of 15:1. Most of the patients were euthyroid (73%). Majority of the thyroid nodules were malignant (85.4%) and only 14.6% were benign on clinical assessment. The sensitivity of clinical evaluation was 84.6%, specificity 13.6%, positive predictive value 53.6%, negative predictive value 42.8%. Percentage of the false negative, false positive and overall accuracy was 57.1%, 46.3% and 52% respectively.

Conclusion:

Even though the sensitivity is high, clinical assessment has low specificity. So we cannot rely on clinical assessment in predicting malignancy in the thyroid nodules.

Key words: Malignancy, Sensitivity, Thyroid nodule.

INTRODUCTION:

Thyroid gland stands out from other endocrine glands in the sense that it is the largest of all endocrine glands weighing about 20-25 grams and lies in the anterior neck.¹ It is the first endocrine gland to appear in the fetus and the only one which is amenable to direct physical examination because of its superficial position.² The normal thyroid is impalpable. The term goiter (Lt: gutter=throat) is used to describe generalized enlargement of thyroid gland. Despite the discovery of gland in the neck during the renaissance period and knowledge that its enlargement causes neck swelling, it took until 1656 AD for this gland to be given its modern name "Thyroid Gland" by Thomas Wharton.³

The clinical spectrum of thyroid swelling ranges from the incidental, asymptomatic, small, solitary nodule to the large, partly intrathoracic nodule that causes pressure symptoms. Benign thyroid swellings can be managed conservatively but not in case of malignancy. So, the main concern is to exclude the malignancy in these swellings. The incidence of clinically apparent thyroid nodule is 4-5% and the incidence of the malignancy in the thyroid nodule is 5-10%.^{2,4} The challenge to clinician is to identify minority of patients with thyroid cancer who therefore require surgical intervention. The usual presentation is an asymptomatic neck mass that is discovered by either the patient or the clinician. Factors that increase the risk of malignancy are: previous neck irradiation, rapid growth, symptoms of compression or invasion such as dysphagia, dysphonia, pain, male sex, age younger than 20 years or older than 60 years, family history of thyroid cancer or multiple endocrine neoplasia. Compression symptoms such as globus sensation, dysphagia or recumbent dyspnoea may develop. Tracheal deviation or narrowing may develop, although vocal cord paralysis is unlikely and should raise the suspicion of malignancy. Features to be noted include the thyroid size, consistency, nodularity, tenderness or fixation. The thyroid examination is not complete without assessment of lymphadenopathy in the supraclavicular and cervical regions of the neck.^{5,6} We do have a variety of tests to determine the nature of the thyroid swellings. This study aims the clinical judgment on prediction of the malignancy in the thyroid swellings.

MATERIALS AND METHODS:

We conducted a prospective longitudinal study at the department of the ORL & HNS and department of Pathology, BPKIHS, Dharan. All the patients with thyroid swellings who underwent surgery at the department were included in the study. 48 consecutive patients with thyroid swellings during the period of 12 months from April 2012 to

March 2013 were included. Ethical approval was obtained from the institutional ethical review board (IERB) and informed written consent was taken from the patients. Cases those were on radiotherapy and iodide therapy before surgery and patient unfit for the surgery were excluded from study. Detailed history of swelling, primary symptoms and associated symptoms, past medical and surgical history, personal, drug and other relevant history was taken. The thyroid gland and other ENT examination was carried out. The malignant thyroid swelling was suspected clinically when: nodules were larger than 4 cm, firm, fixed to adjacent skin and soft tissue which may indicate extra glandular invasion, presence of palpable cervical lymphadenopathy in the presence of a thyroid nodule, presence of the hoarseness, dysphagia, pain, and puckering of overlying skin. The provisional diagnosis was made on the ground of the above mentioned feature. Standard thyroid surgery was carried out and dissected portion of thyroid was sent for histopathological examination. Data was summarized using frequency distribution tables and graphical methods of presentation of data (Bar diagram, Multiple bar diagram, pie charts etc). Data was analyzed by SPSS-17 software. Chi-square test applied for the analysis of the data.

RESULTS:

48 consecutive patients were enrolled in the study. Most of the patients were females accounting 94% (45) compared to male 6% (3). The female to male ratio was 15:1 which was very high. 62% (30) of patient were less than or equal to 45 years and 18 (38%) patients were more than 45 years. The mean age was 41.42 years. Out of 48 cases, 26 were malignant and 22 were benign nodules. Out of the 26 malignant cases, 10 were more than 45 years and 16 were less or equal to 45 years. Most of the cases were from the terai region 77.1% (37) followed by hilly (16.7%) and mountain region (6.3%). Most of the patient visited the physician for the anterior neck swelling 96% (46) and 4% (2) patients for the foreign body sensation throat. Very few patients, 4% (2) had feature of the hyperthyroidism at the time of the presentation otherwise 96% were euthyroid. Clinically most of the thyroid nodules were malignant 85.4% (41) and only 14.6% (7) were benign. 73% (35) of the nodule were \leq 4cm and 27% (13) were more than 4 cm. Among \geq 4 cm nodules, 17 were malignant and 18 were benign where as in nodules \leq 4 cm 5 out of 13 were malignant. The sensitivity and specificity of the thyroid nodule of size more than 4 cm in predicting malignancy was 30.8% and specificity 77.3%. The association of nodule size with malignancy was not statistically significant ($p=0.532$). 73% (35) of the thyroid nodules were firm, 6% (3) were hard and 21% (10) were soft. Among firm to hard nodules,

the malignancy was seen in 21 out of the 38. The sensitivity of firm to hard nodule on predicting malignancy was 80.8% and specificity of 22.7% and its association with malignancy was statistically not significant ($p=0.766$). One nodule was fixed to the surrounding tissue which was malignant. The other malignant nodules were not fixed to the surrounding tissue having sensitivity of 3.8% ($p=0.353$). The sensitivity and specificity of the irregular surface for malignant nodule was 11.5% and 90.9% respectively and its association was statistically not significant ($p=0.782$). The concurrent cervical lymph nodes were palpated in 4 cases only and 3 was histologically malignant. Out of the 26 malignant thyroid nodes, 23 nodules have no palpable lymphadenopathy. The sensitivity was only 11.5% and specificity 95.5% which was not significant. ($p=0.382$). The sensitivity and specificity of clinical evaluation was found to be 84.6% and 13.6%. Positive predictive value, negative predictive value, percentage of the false negative, percentage of false positive and overall accuracy of clinical evaluation were 53.6%, 42.8%, 57.1%, 46.3%, and 52% respectively.

DISCUSSION:

The thyroid nodules are a common clinical entity. Although autopsy data indicates the 50% prevalence of the thyroid nodules larger than 1 cm in asymptomatic patients, the prevalence of the palpable nodule is only 4% to 7%.^{8,9} The clinical importance of the thyroid nodule rests on ability to exclude the thyroid cancer which occurs in 5-15% depending on the age, sex, family history, exposure to radiation and the other factors.^{10,11} The worrisome about the thyroid cancer is that the yearly incidence has increased from 3.6 per 100,000 in 1973 to 8.7 per 100,000 in 2002, 2.4 fold increment and this trend is progressing forward.¹² In such circumstances, it's very important to identify these malignant nodules for early intervention. The most common age group affected was 31 years to 40 years which were 13 (27%) followed by age group of 41 years to 50 years. Younger age group were affected most and mean age was comparable to other studies.^{13,14} The chance of malignancy in the thyroid nodule at extremes of ages (<20 years and more than 70 years) is more. Thyroid nodules were common in females as high as 16:1 which may be due to high prevalence of endocrine disorder in females.¹³ There is an increased risk of the thyroid nodule to be malignant when there is prior head and neck irradiation, family history of the medullary thyroid carcinoma or multiple endocrine neoplasia, male gender, presentation at extremes of age (less than 20 years or more than 70 years) and the nodule with a rapid growth, dysphagia and dysphonia.^{10,15} Physical findings that increase the concern for malignancy include nodules larger than 4 cm in size (19.3% risk of malignancy), firmness to palpation, fixation of the nodule to adjacent tissues, cervical lymphadenopathy and vocal fold immobility.¹⁶ Many studies demonstrate that the size of the nodule greater than 4 cm is more likely to be malignant.¹⁶ Even the size of the nodule ≥ 2 cm in diameter was also a significant predictor of malignancy.¹⁷ The risk of malignancy in nodules measuring 3 cm or more was 55% vs. 23% in less than 3 cm.¹⁸ Papillary thyroid carcinoma can occur in the sub-centimeter nodules and the size of the nodule cannot predict the malignancy. The firm to hard nodule harbors the malignancy more often than the softer nodules. In the study conducted by Islam et al, malignant lesion was more common in hard nodule (70%).¹⁹ The fixity of the thyroid nodule to the surrounding tissue indicates the extra-glandular extension of the tumor. Our study demonstrated only one nodule to be fixed to the surrounding tissue which was malignant. The other malignant nodules were not fixed to the surrounding tissue having the sensitivity of 3.8% for malignancy which is too low. The rapid growth of the thyroid nodule may be the feature of the malignant thyroid nodule. The rapid increase in the size may be due to the true growth of the tumor, hemorrhage or cystic changes. Both benign and the malignant thyroid nodule will grow over time but the rapid growth indicates the risk of the malignancy.^{15,20} Most of the malignant nodules shows slow growth pattern and growth pattern has a low sensitivity for predicting malignancy. Irregular border of the nodule represents the disproportionate growth of the tumor but this is not always true in the cases of the thyroid carcinomas. A single smooth small nodule can turn out to be the malignant. Our study shows the sensitivity and specificity of the irregular surface for malignant nodule of 11.5% and 90.9% respectively which is not significant. Cervical lymph node metastases are associated with thyroid cancer (mainly Papillary and Medullary) in about 20% of the patients at the time of presentation.²¹ In our study 23 malignant nodules had no cervical lymphadenopathy with sensitivity of 11.5% which is too low.

Considering the physical characteristic of the swelling, the malignant thyroid were suspected in the 85.4% (41) cases and benign in 14.6% (7). These findings suggest either increase in the incidence of the malignancy or the nodules were over diagnosed as the chance of the solitary thyroid nodule to be malignant is 5-10%.⁷ For the same reason on the clinical background, it is difficult to predict the malignancy more precisely. This study shows the sensitivity of the clinical evaluation was 84.6%, specificity 13.6% and overall accuracy was 52%. Even though the sensitivity of the clinical examination was high, the specificity was too low with low accuracy.

CONCLUSION:

Although the suspicion can be made on clinical assessment, we cannot rely on it in predicting malignancy in the thyroid nodules as it has a very low specificity and accuracy.

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