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The incidence of malignancy in patients with thyroid nodules: A prospective population study

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Abstract--Background: Thyroid nodules are extremely common with a prevalence about 20 – 76% of adult population. Thyroid cancer is present in about 5% of nodules, even though rates as high as 15% have been reported. To determine whether the nodule is benign or malignant, fine needle aspiration biopsy (FNA biopsy) is the clinical procedure of choice.

Objective: to evaluate thyroid nodules in order to determine the incidence of malignancy in these nodules. Patient and Methods: A prospective study was conducted among 415 patients presented with thyroid nodules in the surgical outpatient clinic in Al – Kadhimain medical city from February 2020 to February 2022. Patients between 15 to 75 years of age, both male and female patients, were included in this study. The assessment was done by thorough history, clinical examination, thyroid profile test, neck ultrasound and fine needle aspiration cytology. After fine needle aspiration, diagnostic cytology was classified according to British Thyroid Association guidelines as THY1: non diagnostic, THY2: benign (non - neoplastic), THY3: intermediate (including follicular neoplasm), THY4: suspicion of malignancy and THY5: diagnostic of malignancy. Surgery was done for patients with THY3, THY4 and THY5 cytology in addition to some patients with THY2 cytology if associated with ultrasonographic suspicious criteria. After surgery, the final diagnosis was based on histopathological examination of the nodules and the entire gland. Results: the mean age of the incidence of thyroid nodules is 45 years with female preponderance more than males. The overall risk malignancy in patients with thyroid nodules in our study was 11.56%. Conclusion: Ultrasonography and fine needle aspiration cytology are extremely important in evaluating thyroid nodules. Patients with THY3 thyroid nodules should be carefully assessed. The aim of this study was to evaluate thyroid nodules in order to determine the incidence of malignancy in these nodules.

Keywords---thyroid nodules, malignancy, non – neoplastic, follicular neoplasm.

Introduction

Thyroid nodules are extremely common with a prevalence about 20 – 76% of adult population^[1]. Thyroid cancer is the most common endocrine malignancy accounting for 2.1% of all cancer diagnosis worldwide^[2]. The incidence has been increasing over the past few decades^[3,4]. Thyroid cancer is present in about 5% of nodules, even though rates as high as 15% have been reported^[1,5,6]. To determine whether the nodule is benign or malignant, fine needle aspiration biopsy (FNA biopsy) is the clinical procedure of choice^[5,7,8]. According to European Thyroid Association and the American Thyroid Association guidelines and recommendations to evaluate thyroid nodules, nodules that are 1 cm or greater in dimension and are non – functioning require further evaluation by FNA biopsy. If the thyroid stimulating hormone (TSH) is suppressed, radionuclide scintigraphy is indicated to rule out a functioning nodule. Nodules that are less than 1 cm in dimension but associated with suspicious ultrasonographic criteria require further investigations. These criteria are hypoechogenicity, microcalcification, irregular margins, intranodular vascularity and regional lymphadenopathy^[9, 10]. The aim of this study was to evaluate thyroid nodules in order to determine the incidence of malignancy in these nodules.

Materials and Methods

Patients

This study was conducted among 415 patients presented with thyroid nodules in the surgical outpatient clinic in Al – Kadhimain medical city from February 2020 to February 2022. The assessment was done by thorough history, clinical examination, thyroid profile measurement, ultrasonography and fine needle aspiration (FNA) cytology. By ultrasonography, the following criteria were determined for each nodule:

- Size
- Echogenicity
- Margin irregularity
- Presence or absence of calcification
- Presence of peripheral or intranodular vascularity
- Parenchymal composition (solid, cystic or complex)

If TSH was not suppressed, FNA was done for all nodules larger than 10 mm or nodules smaller than 10 mm but associated with suspicious criteria on ultrasonography. If TSH was suppressed, then radionuclide scan was obtained and autonomously functioning nodules was not aspirated. After fine needle aspiration, diagnostic cytology was classified according to British Thyroid Association guidelines as follow:

- THY1: non diagnostic
- THY2: benign (non - neoplastic)

- THY3: intermediate (including follicular neoplasm)
- THY4: suspicion of malignancy
- THY5: diagnostic of malignancy

Surgery was done for patients with THY3, THY4 and THY5 cytology in addition to some patients with THY2 cytology if associated with ultrasonographic suspicious criteria such as hypoechogenicity, microcalcification, irregular margins, intranodular vascularity and regional lymphadenopathy. After surgery, the final diagnosis was based on histopathological examination of the nodules and the entire gland.

Analysis of Data

Analysis of data was carried out using available statistical package of SPSS-26 (statistical package for Social Sciences-version 26).

Results

This study was conducted among 415 patients who attended the surgical outpatient clinic in Al – Kadhimain medical city. The patients included in his study were aged between 15 and 75 years with mean age of 45. Among those 415 patients, 339 (81.68%) patients were females and 76 (18.31%) patients were males (Table 1).

Table 1
Gender of patients with thyroid nodules

Sex	Number of patients (total = 415)	Percentage %
Male	76	18.31
Female	339	81.68

Cytology results

Out of 415 patients, 9 patients (2.16%) had non diagnostic cytology result (THY1), 349 patients (84.09%) had benign lesion (THY2), 18 patients (4.33%) had indeterminate / follicular lesion (THY3), 15 patients (3.61%) had lesion with suspicion of malignancy (THY4) and 24 patients (5.78%) had malignant lesion (THY5) Table (2).

Table 2
Cytology results of patients with thyroid nodules

Cytology result	Number of patients (total = 415)	Percentage %
THY1	9	2.16
THY2	349	84.09
THY3	18	4.33
THY4	15	3.61

THY5	24	5.78
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Histopathology results

A total of 112 patients underwent surgical resection. Out of those patients, 48 patients had malignant lesion and 64 patients had benign lesion. Out of 39 patients with cytological results of THY 4 and THY5, 37 patients were confirmed to have malignant lesions by histopathology. Out of 18 patients with THY3 cytology results, 11 patients had malignant lesion Table (3).

Table 3
Incidence of malignancy in each cytology result of patients with thyroid nodules

Cytology result	Number of patients (total = 415)	Number of patients with malignant lesion (total = 48)
THY1 + THY2	358	0
THY3	18	11
THY4 + THY5	39	37

The overall risk malignancy in patients with thyroid nodules in our study was 11.56% Table (4).

Table 4
Incidence of benign and malignant lesions in patients with thyroid nodules

Type of lesion	Number of patient (total = 415)	Percentage %
Benign	367	88.43
Malignant	48	11.56

Discussion

The aim of this study was to determine the incidence of malignancy in patients with thyroid nodules. According to European thyroid association and American association of clinical endocrinologist recommendations, all nodules above 1 cm as well as nodules less than 1 cm but with suspicious ultrasound criteria were examined and assessed. The overall incidence of malignancy was 11.56%. our results were similar to that obtained by other studies with reported risk of malignancy ranging between 5 – 15%^[1,5,6,12]. Higher incidence of malignancy was found by Kim DL and his group who examined all nodules above 3 mm with cancer prevalence of 21.6%^[13]. In contrast, lower incidence of malignancy was found by Papini E and his group who examined only nodules between 8 – 15 mm with cancer prevalence of 7.7%^[14]. Another study from Spain showed an incidence of malignancy of 24.9%^[15]. In this study, the incidence of malignancy in patients with THY3 nodules was 61.11% (11 patients out of 18 patients). These results are in agreement with other studies. Therefore, THY3 nodules should be considered as suspicious finding that require further assessment even by surgical excision^[16, 17].

Conclusion

The overall incidence of malignancy in patients with thyroid nodules in our study was 11.56%. Ultrasonography and fine needle aspiration cytology are extremely important in evaluating thyroid nodules. Patients with THY3 thyroid nodules should be carefully assessed.

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