

The outcome of Papillary Thyroid Carcinoma in Goiter and its Relation to Medical Radiation Exposure in Al-Diwaniyah Teaching Hospital

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Abstract

Background

Papillary thyroid carcinoma is the most prevalent thyroid malignancy, and it is rapidly increasing in incidence due to the availability of diagnostic tools. It occurs most commonly in individuals who live in regions with high exposure to radiation and increase use of x-ray (medical radiation), which is considered a significant risk factor.

The Aim of study

To identify the outcome of papillary thyroid carcinoma among patients subjected to thyroidectomy in Al-Diwaniyah Teaching Hospital and its relation to medical radiation exposure.

Patients and methods

A prospective study was done in Al-Diwaniyah Teaching Hospital started from January 2018 to March 2020 on (250) patients who have goiter. We evaluate all patients by history, thorough clinical examination and send them for investigations (laboratory and radiological). Total thyroidectomy was done for all patients and post-operative observation in the surgical ward for any complications.

Results

The incidence of papillary thyroid carcinoma was (14%), more common in female (77.2 %) than male (22.8 %). It was more common in solitary thyroid nodule (65.7 %), while in multinodular goiter was (34.7 %). The exposure to medical radiation is very significant in patients proved to have papillary thyroid carcinoma about (80 %); but the result of FNAC examination has low sensitivity about (34.3 %).

Conclusion

Thyroid malignancies are common in our regions with papillary thyroid carcinoma is the commonest type. X-ray and medical radiation exposure is an important risk factor for papillary thyroid carcinoma especially during childhood, with female patients more frequently affected and more common in solitary thyroid nodule.

Introduction

Thyroid gland: The color of an adult thyroid gland is brown and the consistency is firm and is situated in the neck posterior to the strap muscles ⁽¹⁾. The weight of normal thyroid is about 20 g, but this weight varies with body weight of individuals and iodine intake ⁽¹⁾. The thyroid consists of two lobes, left and right and the isthmus connects these two lobes ⁽²⁾. Each lobe being about 5 cm in long, 3 cm in wide and 2 cm in thickness ⁽³⁾. The pyramidal lobe of the gland is present in nearly 50 % of patients ⁽¹⁾. The lobule is considered the functioning unit, which is usually supplied by a single arteriole, and consists of 24-40 follicles lined by cuboidal epithelium ⁽⁴⁾. **Papillary thyroid carcinoma:** Papillary carcinoma is the commonest type of thyroid carcinoma ⁽⁴⁾. Up to 30 % of patients who die of non-thyroid disease have deposits of papillary thyroid carcinoma in autopsy studies ⁽⁴⁾. Papillary carcinoma occurs more commonly in female than in male, with a 2: 1 female-to-male ratio. The mean age at diagnosis of papillary carcinoma is 30 - 40 years ⁽¹⁾. Most patients presented in euthyroid status and

has slowly growing painless neck mass ⁽¹⁾. Other symptoms such as dyspnea, dysphagia, and voice changes usually occur with locally advanced invasive disease ⁽¹⁾. Distant metastases are uncommon with papillary thyroid carcinoma at initial presentation, but may develop in 20% of patients and mostly to lungs, bone, liver and brain ⁽¹⁾.

Pathology: Papillary Projections may be defined in pathological examination of specimen. Sometimes mixed pattern of papillary and follicular structures, or a pure follicular pattern (follicular variant) may also occur⁽¹⁾. Characteristic nuclear and cellular features can establish the diagnosis in cytological examination. Cells are cuboidal in shape with pale, abundant cytoplasm; overcrowded nuclei may show "grooving," and intranuclear cytoplasmic inclusions leading to the appearance of Orphan Annie nuclei⁽¹⁾. Psammoma bodies, which are microscopic, calcified deposits represent clumps of sloughed cells also may be seen⁽¹⁾.

Diagnosis: Thyroid stimulating hormone level is important in workup. Neck ultrasound (features suggestive of malignancy in thyroid nodules are micro calcifications, hypo echogenicity, and irregular margins or absent halo sign)⁽⁵⁾. FNAC remains the most accurate and cost effective method for evaluating the nodules ⁽⁶⁾. It can be performed with either palpation or U/S assistance⁽⁶⁾.

The aims of the study:

To identify the outcome of papillary thyroid carcinoma between individuals subjected to thyroidectomy in Al-Diwaniyah Teaching Hospital and its relation to medical radiation exposure.

The patients and methods:

A prospective study was done in Al-Diwaniyah teaching hospital started from January 2018 to March 2020 on (250) patients with goiter who have total thyroidectomy. Of those (250) patients there were (68) male and (182) female. The age range from 20-60 years with mean (47.4) years. We found (35) patients proved to be papillary thyroid carcinoma (8) male and (27) female.

All those patients carefully checked by detailed history and thorough clinical examination were done at time of admission, and appropriate preoperative preparations have been done for them as needed. Then, we proceed for operation; total thyroidectomy was the procedure of choice with neck dissection preserved for only nodal metastasis.

Post operatively patients kept in the surgical ward with head elevation 30 degree with observation of breathing and oxygen saturation, stridor, hematoma formation. Patients received analgesia and antibiotic, drain removed in 24-48 hours depending on the quantity of collection in drain. Thyroid specimen sent for histopathology.

Results

Table1: gender distribution of patients with papillary thyroid carcinoma.

Gender	Number	Percentage
Male	8	22.8 %
Female	27	77.2 %

Total	35	100 %
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Table 2: results of histopathological examination.

Result	Number	Percentage
Papillary thyroid carcinoma	35	14 %
Follicular adenoma	117	46.8 %
Nodular colloid goiter	52	20.8%
Colloid cyst	46	17.5 %
Total	250	100 %

P value 0.001

Table 3: Number and percentage of patients with papillary thyroid carcinoma and history of radiation exposure (repeated neck X-Ray, CXRay and CT scan).

Radiation exposure	Number	Percentage
Positive	28	80 %
Negative	7	20 %
Total	35	100 %

P value 0.0003

Table 4: The number and percentage of solitary and multinodular goiter diagnosed with papillary thyroid carcinoma.

Thyroid gland status	Number	Percentage
Solitary	23	65.7 %
Multinodular	12	34.7 %
Total	35	100%

P value 0.063

Table 5: Preoperative FNAC result.

FNAC	Number	Percentage
Positive	12	34.3 %
Negative	23	65.7 %
Total	35	100 %

P value 0.063

Discussion

In present study 35 patients proved to have papillary thyroid carcinoma, the female were the predominant 27 (77.2 %) and male were eight (22.8 %). This goes with the study by Saleh M. AL-Salmah⁽⁷⁾ in 2002 (83.6 %) of cases where in the female and (19.4 %) in the male. Pang and Chung⁽⁸⁾ also made similar observations in 2010. Thyroid malignancy has a higher incidence rate between women in Arab Gulf in addition, is the second commonest cancer among females⁽⁹⁾.

In present study, (80 %) of cases of papillary thyroid carcinoma have history of previous exposure to medical radiation. This finding is similar to findings of (Nikiforov et al.) study⁽¹⁰⁾ in the (USA) in (2010), which states that the long exposure to the medical radiation is an important risk factor for thyroid malignancy. Also, the findings of another study of the same previous country in (2014) by (Aschebrook-Kilfoy et al.)⁽¹¹⁾ stated that the occupational hazard for thyroid malignancy is an important risk factor especially in occupations with exposure to ionizing radiation. Similar results noted by a study done in Al-Kuwait about thyroid carcinoma and states that there is association with Dental X-rays⁽¹²⁾.

We found in present study that the prevalence of (papillary thyroid carcinoma) in solitary thyroid nodule (65.7 %) which is greater than that with cases of multinodular (34.7 %). Various other investigators have reported the similar higher percentage of malignancy in solitary nodules, the study by Seetupalo⁽¹³⁾ were found that the carcinoma in solitary (38 %) while in multinodular (15 %). Anwar et al (24 %) ⁽¹⁴⁾ and Nanjappa et al (23 %) ⁽¹⁵⁾.

In present study, patients proven to have papillary thyroid carcinoma by preoperative FNAC were 12 (34.3 %) and those with negative FNAC were 23 (65.7 %). These results are in contrast to finding of (Sharma) study (2015) that carried out in (India).⁽¹⁶⁾ Which stated that the FNAC is highly precise diagnostic tool for the diagnosis of thyroid malignancy (accuracy of FNAC was 97%) and significant similarity to histopathological examination results, these differences depend on the histopathologist and the technique that they used.

Present study state that the incidence of papillary thyroid carcinoma was (14 %) among patients operated on for goiter. This finding is similar to the results of Taşova et al. study (2013) ⁽¹⁷⁾.

Our study incidence of papillary thyroid carcinoma is more than (Kaliszewski et al.) study (2016) in Poland ⁽¹⁸⁾ which state that between (2306) patients with goiter, the incidence of thyroid malignancy was (2.12 %). In addition, Scopa study (2004) ⁽¹⁹⁾ show that the incidence of thyroid carcinoma between patients with goiter was about (4–17 %) and the papillary thyroid carcinoma accounts for nearly 80% of thyroid carcinomas. Which is close to our study result. In present study, the result of histopathological examination states that the commonest benign result of patients with goiter was the follicular adenoma (46.8 %). This result goes with study by Ayad J. Matar in 2016⁽²⁰⁾, which found that the common common benign tumor was the adenoma (53 %).

Conclusions

1. Papillary thyroid carcinoma is the commonest type of thyroid carcinoma, and the thyroid malignancy became common in our region.
2. Female patients more frequently affected with papillary thyroid carcinoma than male.
3. Solitary thyroid nodule more likely for malignancy than multinodular.
4. The FNAC sensitivity was low and this depending on the pathologist and technique used for procedure.
5. X-ray exposure especially in childhood was a significant risk factor for papillary thyroid carcinoma.

Recommendations

1. Recommend to study larger numbers of patients that have goiter and prevalence of papillary thyroid carcinoma.
2. Check the level of radiation in the areas of patients with papillary thyroid carcinoma and highlight the hazard of overuse of medical radiation in radiation exposure.

3. We need a screening program to detect any development of cancer in pre-existing goiter, as Iraq is an endemic goiter area.
4. Recommend to do all FNAC under ultrasound guide.

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