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Ammar Dakhil Faisal✉, Adil Musa Al-Rekabi
Al-Diwaniyah Teaching Hospital, Al-Diwaniyah, Iraq

Incidence of Papillary Thyroid Carcinoma Among Patients Who Underwent Total Thyroidectomy in Al-Diwaniyah Teaching Hospital

Conflict of interest: nothing to declare.
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Contacts: ibadyamar@gmail.com

Abstract

Introduction. Papillary thyroid cancer (PTC) is the most frequent cancer among thyroid malignancies, and its incidence is rapidly increasing due to the availability of diagnostic tools. PTC occurs more often in individuals living in areas with excessive exposure to radiation and frequent use of X-rays, which can be considered important risk factors.
Purpose. To evaluate the incidence of PTC among patients who underwent thyroidectomy in Al-Diwaniyah teaching hospital.
Materials and methods. A prospective study was conducted in the general surgery department in Al-Diwaniyah Teaching Hospital during the period from February 2016 to October 2018 on 432 patients with goiter, of whom 62 patients proved to be PTC
Results. Of the 62 patients, 49 (79%) were females and 13 (21%) were males, with a solitary thyroid nodule predominant (61.3%). The radiation exposure is highly significant in patients proven to have PTC about 85.48%), the FNAC sensitivity was low, about 37%. There were 14 patients re-explored either for remnant thyroid tissue in 11 or for neck dissection in 3 patients. Only 3 cases of occult PTC.
Conclusion. PTC is the most common thyroid malignancy with 14.35%, with X-ray a significant risk factor for PTC during childhood, with female patients more frequently affected and more common in solitary thyroid nodules, and it's advisable to do a central neck dissection.
Keywords: papillary thyroid cancer, thyroid malignancy, follicular thyroid neoplasm, goiters, FNA

Аммар Дахиль Фейсал✉, Адиль Муса Аль-Рекаби
Учебная больница Аль-Дивания, Аль-Дивания, Ирак

Частота возникновения папиллярного рака щитовидной железы среди пациентов, перенесших тотальную тиреоидэктомию в университетской больнице Аль-Дивания

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Контакты: ibadyamar@gmail.com

Резюме

Введение. Папиллярный рак щитовидной железы (ПРЩЖ) является наиболее распространенным видом рака среди злокачественных новообразований щитовидной железы, и его выявляемость увеличивается благодаря доступности диагностических инструментов. ПРЩЖ чаще встречается у людей, проживающих в районах с чрезмерным облучением и частым использованием рентгеновских лучей, что можно считать важными факторами риска.
Цель. Оценить частоту ПРЩЖ среди пациентов, перенесших тиреоидэктомию в университетской больнице Аль-Дивания.
Материалы и методы. Проспективное исследование проводилось в отделении общей хирургии университетской больницы Аль-Дивания в период с февраля 2016 г. по октябрь 2018 г. среди 432 пациентов с зобом, у 62 из которых был диагностирован ПРЩЖ.
Результаты. Из 62 пациентов было 49 (79%) женщин и 13 (21%) мужчин, преобладал солитарный узел щитовидной железы (61,3%). Доза облучения была значительно выше у пациентов с подтвержденным ПРЩЖ (85,48%), чувствительность тонкоигольной аспирационной биопсии (ТАБ) была низкой – около 37%. 14 пациентам была проведена повторная операция: 11 – для удаления остаточной ткани щитовидной железы, 3 – для диссекции шеи. Было выявлено только 3 случая скрытого ПРЩЖ.
Заключение. ПРЩЖ является наиболее распространенным злокачественным новообразованием щитовидной железы (14,35%), при этом рентгенологическое исследование является значительным фактором риска развития ПРЩЖ в детском возрасте, чаще поражает женщин. Солитарные узлы щитовидной железы встречаются чаще, рекомендуется проведение центральной диссекции шеи.
Ключевые слова: папиллярный рак щитовидной железы, злокачественные новообразования щитовидной железы, фолликулярная опухоль щитовидной железы, зоб, ТАБ

■ INTRODUCTION

Thyroid cancers can be classified according to their histopathological characteristics [1]. Papillary thyroid cancer (75% to 85% of cases [2]) – often in young females – excellent prognosis. Newly reclassified variant: noninvasive follicular thyroid neoplasm with papillary-like nuclear features is considered an indolent tumor of limited biologic potential. Follicular thyroid cancer (10% to 20% of cases [2]) – occasionally seen in people with Cowden syndrome. Some include Hürthle cell carcinoma as a variant, and others list it as a separate type [3]. Medullary thyroid cancer (5%to 8% of cases) – cancer of the parafollicular cells, often part of multiple endocrine neoplasia type 2 [2]. Poorly differentiated thyroid cancer and Anaplastic thyroid cancer (less than 5% of cases [2]) is not responsive to treatment and can cause pressure symptoms, besides other conditions, thyroid lymphoma, squamous cell thyroid carcinoma, and sarcoma of the thyroid.

PTC is the most common type of thyroid cancer [2] representing 75 percent to 85 percent of all thyroid cancer cases [3]. It occurs more frequently in women and presents in the 20–55-year age group. It is also the predominant cancer type in children with thyroid cancer, and in patients with thyroid cancer who have had previous radiation to the head and neck [4]. It is often well-differentiated, slow-growing, and localized, although it can metastasize. Researchers believe that changes in certain genes cause thyroid cells to abnormally develop and divide, and this may cause the development of papillary thyroid cancer. There are several genes that have been connected to this form of thyroid cancer [5].

FNA accuracy is very high, and it is a process widely used in these cases. Other investigation methods include ultrasound imaging and nuclear scan [6]. The thyroid ultrasound is also very effective in discovering microcarcinomas, which refer to very small carcinomas (<1 cm) [7].

Thyroglobulin can be used as a tumor marker for well-differentiated papillary thyroid cancer [8]. HBME-1 staining may be useful for differentiating papillary carcinomas from follicular carcinomas [9].

Lymphatic spread is more common than hematogenous spread. Multifocality is common in the so-called Lateral Aberrant Thyroid is actually a lymph node metastasis from PTC [10].

Papillary microcarcinoma is a subset of papillary thyroid cancer defined as measuring less as or equal to 1 cm [11]. The highest incidence of papillary thyroid microcarcinoma in an autopsy series was reported by Harach et al. in 1985, who found 36 of 101 consecutive autopsies to have an incidental microcarcinoma [12]. Michael Pakdaman et al. report the highest incidence in a retrospective surgical series at 49.9 percent of 860 cases [13]. It was Woolner et al. who first arbitrarily coined the term "occult papillary carcinoma" in 1960, to describe papillary carcinomas ≤1.5 cm in diameter [14].

■ MATERIALS AND METHODS

A prospective study was conducted in Al-Diwaniyah teaching hospital during the period from February 2016 to October 2018 on 432 patients with goiter, whether multinodular or solitary thyroid nodule, who underwent total thyroidectomy. Of those 432 patients, there were 123 males and 309 females. The age range is from 30–60 years, with a mean of 49.6. From those 432 patients, we found 62 patients proved to be PTC. All those patients were carefully evaluated by a detailed history, and a thorough clinical examination was done at the time of admission.

Investigation

Chest x-ray, neck x-ray. Blood test (CBP, blood urea, blood sugar, viral screen, and liver function test). ECG and echo study. Thyroid function test. Neck ultrasonography. FNAC and TRUE-CUT biopsy. ENT consultation for vocal cord assessment.

After full clinical assessment and selection of the patient for surgery according to patient indication, we admit the patient to the hospital, and the following were the prerequisites: Informed consent of all patients for surgery was taken; Medical and anesthetics consultation for fitness for general anesthesia; Prophylactic antibiotic (1 g ceftriaxone vial) intravenously on induction of anesthesia. After full preparation of all patients for surgery, we proceeded with the operation the next day. Total thyroidectomy was the procedure of choice, with neck dissection preserved for only nodal metastasis.

Statistical analysis

The quantitative variables that had a parametric distribution are presented as mean and standard deviation the qualitative variables are presented as absolute and relative frequencies. The relationship between qualitative variables was analyzed by comparing their frequencies using the chi-square test. The statistical software SPSS® (SPSS® Inc., Illinois, USA) was used for all analyses, and the statistical significance was set at $p \leq 0.05$.

■ RESULTS

Ranging patients aged between 30–60 years with a mean age of 49.6 years, and the most frequent ages were between 40–50 years. Males were 28.5% and females were 71.5%. About 50% of patients with goiter were in the age group (40–50 y), with 50.9%. From those patients 432 who underwent thyroidectomy, the number of patients were found to be PTC found to be 62 cases. The percentage of PTC from the total number of patients was 14.35%) (Table 1).

From those 62 PTC patients, male patients 13 and their percentage were about 21%, and female patients 49 with a percentage of about 79% this table is significant ($p<0.05$) (Table 2).

The number and percentage of solitary nodules that proved to be PTC are greater than those with multinodular goiter, which is significant (Table 3).

Table 1
Age groups distribution

Age groups (years)	No.	%
30–40	160	37
40–50	220	50.9
50–60	34	7.9
>60	18	4.2

Table 2
Gender distribution of patients proved to be PTC

Gender	No.	%
Male	13	21
Female	49	79

The percentage of PTC in solitary thyroid nodules is greater than that in multinodular nodules, with the solitary nodules being higher in females (45.2%). PTC among patients with multinodular goiter in females were 33.9%. It was not statistically significant ($p<0.05$) (Table 4).

We found significant to those with PTC patients with a history of low-dose radiation exposure ($p<0.001$) (Table 5).

The X-RAY exposure was about 62.5% of multinodular goiter in cases that proved to be PTC, while it was 100% in solitary nodules ($p<0.05$) (Table 6).

Table 3
Texture of PTC-proved cases

Texture of thyroid gland	No.	%
Solitary	38	61.3
Mulinodular	24	38.7

Table 4
Numbers and percentages of solitary and MNG according to gender

Gender	Solitary	MNG	Total
Male	10 (16.1%)	3 (4.8%)	13
Female	28 (45.2%)	21 (33.9%)	49

Table 5
History of low-dose radiation exposure (repeated CXR or CT SCAN) during childhood period

Radiation exposure	Patients with PTC
Positive	53 (85.48%)
Negative	9 (14.51%)

Table 6
Patient with low dose radiation exposure who proved to be PTC, whether solitary or multinodular goiter

X-ray exposure	Solitary	Solitary	Multinodular	Multinodular	p-value
Positive	38	38	15 (62.5%)	15 (62.5%)	0.05
Negative	0		9 (37.5%		

Table 7
Pre-operative diagnostic procedure (FNAC) and there significance

Diagnostic tools	No.	%
FNAC +ve	23	37.1
FNAC -ve	39	62.9

Table 8
The negative FNAC proven for PTC by other modalities of investigation

Negative FNAC	No.	%
TRUE-CUT	3	7.6
Histopathology	36	92.4

Table 9
Patients who re-explored for either remnant of thyroid tissue or completion of neck dissection

Re – exploration reason	No. (%)
Remnant thyroid tissue	11 (17.74%)
Completion of neck dissection	3 (4.8%)

The number of patients proven to be PTC by FNAC was 23 (37.1%), and those with negative FNAC were 39 (62.9%), p<0.05. Those patients with negative FNAC the PTC proven by either TRUE-CUT or histopathology (Table 7).

For the 39 patients with negative FNAC, we use other modalities for proving the PTC; the true-cut biopsy was done for only 3 cases, depending on clinical suspicion. All patients who underwent thyroidectomy (Table 8).

Out of 62 patients diagnosed with PTC, there were 3 patients who presented with LN and no palpable thyroid nodule (occult carcinoma of the thyroid gland), representing 4.8% of PTC cases (Table 9).

■ DISCUSSION

In our study we found that goiter presented in female predominantly, 71.5% female, 28.5% male, which goes with study by Ali Al-Katib in Hilla city in which 75% female [15], in study in Baghdad city found females are more affected with goiter (82.5%, 132 patients) than males (17.5%, 28 patients) with ratio 4.7/1 female to male [16].

The commonest ages at presentation in our study were (40–50 years), which resembling with study by Fazal Hussain (2013) in Saudi Arabia [17], while other study by Al-Katib reported that mostly the patients are in the range (31–40 years), 33.3% in study by Seetu Palo (2016) demonstrated majority of the patients were in the 3rd and 4th decade of life [18].

This generally talks about all 432 patients who present with goiter and underwent thyroidectomy.

Our study about the 62 patients proved to be PTC; the females were predominant, 49 (79%), and males were 13 (21%).

In our study PTC rate was 14.35% from patients with goiter; the incidence of papillary cancer has increased from 4.8 to 14.9 per 100,000 from 1975 to 2012. Females are more likely to get papillary cancer when compared to males, with an incidence ratio of 2.5 to 1, where most of the cancers are diagnosed between 40 and 50 years old in females [7], and this is compatible with our study.

We found in our study that the percentage of PTC in solitary thyroid nodule (61.3%) which is greater than that with multinodular (38.7%) with the solitary thyroid nodule higher in female patients about (45%) while in male (16.1%). This go with study by Seetu palo 2016 were found the carcinoma in solitary. Were 38% (38) while multinodular 15%, and female patients were more frequent thyroid malignancy than male in the same study, and consider the second Most common malignancy affecting female patients in Arab gulf [18].

In our findings, there was a positive association between patients who have PTC with X-ray and CT scan exposure and radiation in childhood. In our study, we found that the percentage of patients who were proven to have PTC with a history of low-dose exposure to X-rays was 85.48%.

In a study by Maria L Argentina in 2017. PTC is the most frequent Form of thyroid carcinoma diagnosed after radiation Exposure, with a higher Prevalence of the solid subtype in young Children with a short latency period and of the classical subtype in cases with a longer Latency period after exposure. Molecular Alterations, including intra-chromosomal Rearrangements, are frequently found [19].

In our study, the patients proven of PTC by FNAC were 23 (37.1%) and those with negative FNAC were 39 (62.9%). The sensitivity was about 37% The FNAC was done by a cytologist, not a pathologist, and not under ultrasound Guidance in comparison with a study by Masereka R, Okeny PK in Uganda, Experience That revealed the sensitivity was 61.5% and specificity 89.5%. This study Revealed High specificity and low sensitivity of Fine Needle Aspiration Cytology (FNAC) in detecting malignancy in thyroid nodules [20].

The negative FNAC cases were proven by histopathological examination, which confirmed the PTC. Our patients who were included in the study were those who were confirmed to be PTC by FNAC or, depending on clinical suspicion.

During thyroidectomy, central neck dissection had been done for 59 patients, and only 3 patients had the lateral neck dissection done for them. This concept with studied by Hughes DT et al in 2018. Central neck dissection in clinically Node-negative papillary Thyroid cancer will detect occult lymph node metastasis in approximately half of patients. This may change their postoperative management with regard to adjuvant Radioiodine therapy [21], and the lateral neck dissection was preserved for the clinically or histopathological proven papillary thyroid lymphatic metastasis.

In our study, we found only 3 cases of occult PTC. Occult thyroid carcinoma is mostly discovered by autopsy or by other causes of thyroid surgery. To the best of our knowledge, there have been only a few reports concerning the situation that cervical mass was the initial manifestation of occult PTC in comparison to a study by Yongfu Z. et, they found only 3 cases of occult PTC [22]. As a result, we recommend for future conduction of studies deals with other types of cancer like breast cancers [23–28], gastric cancer [29], CNS tumors [30, 31], anal tumors [32], colorectal cancers [33–36], head and neck carcinoma [37–40], endometrium cancer [41], and ovarian tumor [42] in Al-Diwaniyah city.

■ CONCLUSION

PTC is the most common thyroid malignancy with the thyroid malignancies have become common in our region. It is the most common among patients with goiter who undergo Thyroidectomy, with females more frequently affected. The solitary thyroid Nodule is more prone to malignancy than the multinodular. The X-ray exposure in childhood was a significant risk factor for thyroid malignancy. The FNAC sensitivity was low, and this depends on the pathologist and technique used for the procedure; we depend on the histopathological examination. Central neck dissection is advisable for all patients suspicious for malignancy, with the lateral neck dissection kept for only lymphatic metastasis. The occult PTC represents a rare presentation for PTC.

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