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RESEARCH PAPER

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Epidemiological and histopathological characteristics of thyroid carcinoma in a Tunisian health care center

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Abstract

Background: Thyroid carcinoma (TC) accounts for almost 0.5%–1% of total malignancies. Its incidence is increasing rapidly worldwide. Several studies have drawn up the epidemiological profile of TC and its clinical and pathological features. However, to date, no similar studies have been conducted in Tunisia.

Aims: To establish an epidemiological profile of TC in a Tunisian health care institute and to analyze its clinical and histopathological characteristics in our institute.

Materials and Methods: We present a retrospective study reviewing the cases of TC diagnosed in our institution in a 4-year period.

Results: We collected a sample of 192 cases of TC. It consisted of 31 males and 161 females (83.8%) with a sex-ratio M/F of 0.19. The mean age was 46.4 years. Papillary thyroid carcinoma was the most frequent histological subtype. The multifocality rate was 33.8%. The mean size of TC was 2.2 ± 1.9 cm. 60.9% of TC were staged pT1 and 20.3% had nodal involvement. Papillary thyroid microcarcinomas were noted in 37.5% of cases.

Conclusion: Our results were consistent with those of the literature. A high proportion of pT1 and pN0 tumors were noted in our series, suggesting that TC's diagnosis and management was performed at an early stage of the disease in our institution. In addition, our study enabled us to notice the impact of the Coronavirus disease 19 crisis on the management of TC in our institution. Further studies are needed to establish the epidemiological profile of TC in Tunisia and to assess its clinical and pathological features.

KEYWORDS

coronavirus disease 19, epidemiology, papillary thyroid carcinoma, papillary thyroid microcarcinoma, pathology, thyroid carcinoma

Key points

- We presented a series studying the epidemiological profile of thyroid carcinomas in a Tunisian health care institute and analyzing its clinical and histopathological characteristics.

- Our results were consistent with those of the African and World Series.
- Our data showed female predominance, a higher incidence in the fourth and fifth decades of life.
- Papillary thyroid carcinoma is the most common histological subtype.
- A high proportion of pT1 and pN0 tumors were noted in our series, suggesting that the diagnosis and management of TC are made at early stages of the disease in our institution.
- Our study enabled us to notice the impact of the COVID-19 crisis on the management of TC in our institution.

INTRODUCTION

Thyroid carcinoma (TC) is a relatively rare neoplasm. It accounted for almost 0.5%–1% of total malignancies.[1] Over the past three decades, its incidence rate has been rapidly increasing worldwide, without great variability in the epidemiological and pathological characteristics throughout countries.[2–4] Tunisia has also witnessed this increase in incidence and TC is considered the third cancer in women aged 15–44 years.[2,5] Several studies have drawn up the epidemiological profile of TC and its clinicopathological characteristics. However, similar studies haven't been conducted in Tunisia.

In this study, we present Tunisian series to establish an epidemiological profile of TC in a Tunisian health care institute and to analyze its clinical and histopathological characteristics.

METHODS

We conducted a retrospective study reviewing the cases of TC diagnosed in the pathology department of Habib Thameur Hospital over a 4-year period (January 2018 to December 2021). All patients diagnosed with TC after a total or partial thyroidectomy were included in our study.

Patients' demographics (age, gender) and clinicopathological features (histological subtype, tumor size, number of tumor foci, lymph node metastasis, vascular invasion, capsular effraction, perithyroid involvement, presence of lymphocytic thyroiditis) were obtained from the database of the pathology department's computerized registry.

The criteria of the World Health Organization's (WHO) classification of tumors of endocrine organs (fourth edition, 2017) were used to classify the histological subtypes of tumors.[6] According to this classification, the following histological subtypes were defined: papillary thyroid carcinoma (PTC), follicular thyroid carcinoma (FTC), oncocytic cell carcinoma (OC), poorly differentiated thyroid carcinoma (PDTC), medullary thyroid carcinoma (MTC), anaplastic thyroid carcinoma (ATC). Tumors of uncertain malignant potential, noninvasive follicular neoplasms with papillary-like nuclear features (NIFTP), adenomas, and hyalinizing trabecular tumor were not included in this study.

Papillary thyroid microcarcinoma (PTMC) was defined according to the WHO endocrine organ tumor classification criteria (fourth edition, 2017): a PTC measuring ≤1 cm.[6]

The TNM staging was performed according to the criteria of the eighth edition (2016) of the TNM classification of tumors of the thyroid gland.[7]

When there were multiple tumor foci, the size of the largest one was considered.

The data was collected and subscribed using Excel Software.

RESULTS

A total of 192 TC was diagnosed at our institution between 2018 and 2021. The distribution and percentage of cases by year of diagnosis are presented in Figures 1 and 2.

Our sample consisted of 31 males and 161 females (83.8%) with a sex ratio M/F of 0.19. The mean age was 46.4 ± 13.7 years [12–82]. The mean age at diagnosis was 46.5 years for women and 46.0 years for men.

The distribution by age showed a peak for the groups of 40–59 years (50.0%) and 20–39 years (33.3%), followed by the groups 60–89 years (13.0%); ≥80 years (2.1%) and the group <20 years (1.6%) (Figure 3).

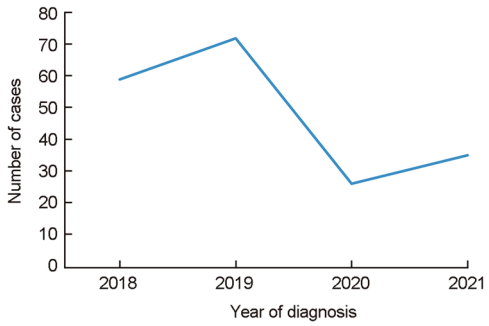

FIGURE 1 Distribution of thyroid carcinomas per year of diagnosis.

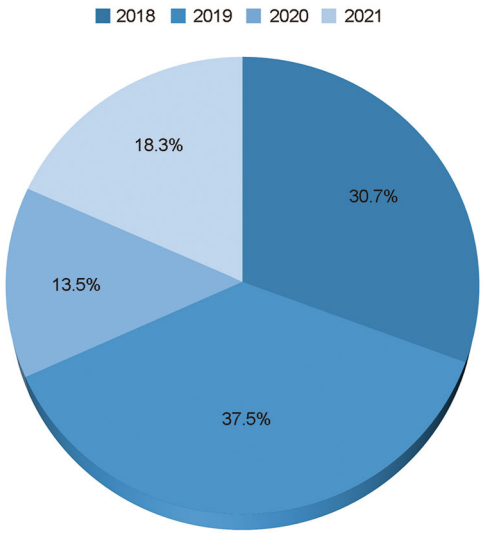

FIGURE 2 Global distribution of diagnosed thyroid carcinomas per year.

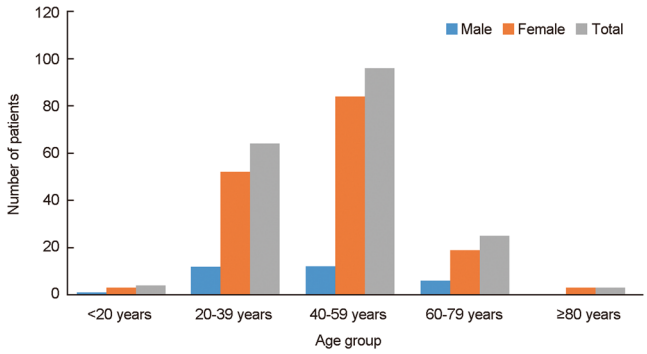

FIGURE 3 Distribution of patients with thyroid cacinomas by age groups.

Total thyroidectomy was performed in 84 cases (43.7% of cases) and loboisthmectomy in 108 cases. Two modalities of total thyroidectomy were noted in our study: (1) total thyroidectomy from the outset performed in 64 cases; (2) total follow-up surgery after definitive histopathological examination in favor of malignancy performed in 20 cases.

Lymph node dissection was performed in 134 cases. Nodal involvement was diagnosed in 39 cases (20.3%). All these 39 cases were PTCs (among which four cases were PTMCs).

Carcinomas were in the right lobe in 72 cases, in the left lobe in 67 cases, and bilateral in 53 cases, Figure 4. The tumors were multifocal in 66 cases (33.8%). Papillary carcinomas were multifocal in 59 cases (34.5% of papillary carcinomas).

Seven histological subtypes were reported. PTC was diagnosed in 171 patients (89.1%), Figure 5 and Table 1. PTMC was diagnosed in 72 cases (37.5% of cases and 42.1% of PTCs).

The tumor mean size was 2.2 ± 1.9 cm [0.1–9.0].

Lymphocytic thyroiditis was associated with TC in 28.7% of cases.

Further histopathological features are presented in Table 2.

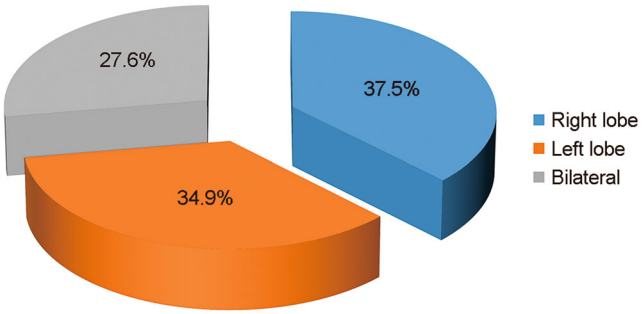

FIGURE 4 Distribution of thyroid carcinomas by localization.

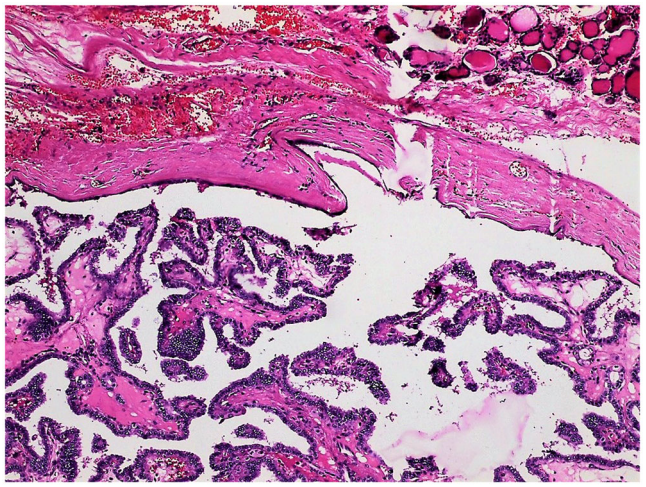

FIGURE 5 Microscopic examination: papillary thyroid carcinoma.

TABLE 1 Distribution of cases according to the histological subtype.

Histological subtype	Number of cases	Percentage (%)
Papillary carcinoma	171	89.1
Oncocytic carcinoma	10	5.3
Follicular carcinoma	8	4.1
Poorly differentiated carcinoma	2	1.0
Anaplasic carcinoma	1	0.5

DISCUSSION

The epidemiological, clinical, and anatomopathological characteristics of TC in our institute were consistent with those reported in various African and world studies (Table 3).

In our study, the number of cases of TC diagnosed in 2019 was higher than in 2018. In our review of literature, many studies have highlighted the increase in incidence of TC worldwide.[2,3,9,11] This increase in incidence could be explained by the improvement of the diagnostic tools based on imaging procedures and fine needle

TABLE 2 Histopathological characteristics of the 192 cases of thyroid carcinoma diagnosed between 2018 and 2021.

Characteristics	Number of patients	Percentage (%)
Number of tumor foci		
1	111	57.8
2	53	27.6
3	8	4.2
≥4	20	10.4
Tumor's size (cm)		
<1	59	30.7
=1	13	6.8
>1 and ≤2	37	19.3
>2	83	43.2
pT stage		
1a	75	39.1
1b	42	21.9
2	39	20.3
3a	27	14.0
3b	4	2.1
4a	5	2.6
4b	0	0
pN stage		
0	95	49.5
1a	30	15.6
1b	9	4.7
x	58	30.2
AJCC staging		
I	174	90.6
II	16	8.4
III	1	0.5
IVb	1	0.5
Vascular invasion		
Absent	160	83.3
Present	32	16.7
Capsular invasion		
Absent	107	55.7
Present	85	44.3
Perithyroid involvement		
Absent	175	91.1
Present	17	8.9
Associated lymphocytic thyroiditis		
Absent	137	71.3
Present	55	28.7

aspiration biopsies. Furthermore, the significant changes in pathological practice are not less important. In fact, sampling techniques have undergone major changes, with a closer examination of the entire surgical specimen, a more exhaustive sampling techniques, and a higher number of samples per case.[11]

However, in our study, we have noticed a decrease in the number of operated TC from 72 cases in 2019 to 26 cases in 2020. This may be due to the health crisis caused by Coronavirus disease-19 (COVID-19) has crippled the entire health system. This crisis led to the delay in diagnosis and treatment of all non-COVID-19 diseases, including TC. In 2021, the number of operated TC had increased (35 cases in 2021 vs. 26 cases in 2020) without reaching the usual levels (58 cases in 2018 and 72 cases in 2019). This underlines the extent of the COVID-19 crisis on our health care system, which will take several years to recover all its resources.

Our study showed a female predominance (83.8% of cases with a sex-ratio M/F of 0.19, a mean age of 46.4 years and a higher incidence in the fourth and fifth decades of life. PTC was the most common histological subtype. These results are consistent with those of African and world series,[8–12] and with those of the Tunisian registry of cancers that reported a mean age of 47.4 years in men and 46.0 years in women. A Tunisian study of 318 differentiated thyroid carcinomas,[14] reported a female predominance of 87.73% and a sex ratio M/F of 0.13. PTC accounted for 83.2% of total cases.

However, few studies reported that younger populations than ours were affected, with a mean age of 37.5 and 39 years, respectively.[14,15]

In our study, the mean tumor size was of 2.2 ± 1.9 cm. In our review of literature, it ranged from 1.57 to 4.3 cm.[8,12,15,16] This large variation in size may be explained by the delay in diagnosis in underdeveloped countries due to the patient's lack of access to diagnostic and therapeutic facilities.

Our data recorded that TC measuring ≤1 cm accounted for 37.5% of our cases. Higher proportions were reported in other studies (37.5% and 50.3%).[8,12] This may suggest that our diagnostic imaging tools would be less efficient than those of some other countries'.

PTMC accounted for 37.5% of total cases and 42.1% of PTCs. Similar results were reported in the literature.[10,12,17,18] The increase in the incidence and the rate of PTMC is related to the improvement of diagnostic means (cervical ultrasound and fine needle aspiration) allowing the detection of these tumors at a subclinical stage.

Our results showed that 33.8% of TC and 34.5% of PTC were multifocal. These results are in line with the literature, since multifocality and multicentricity are common features of TC. The multicentricity rate ranged from 22% to 49%.[8,19,20]

Most of TCs in our series were classified as pT1 (60.9%), suggesting that TC are diagnosed at an early stage in our institution. Similar results were encountered in an Austrian study (54% of TC were pT1).[13]

The rate of lymph node metastasis in our study (20.3% of our cases) was lower than the studies conducted by Shah et al.[15] (44.7%) and Xiang et al.[12] (52.6% TC). This could be explained by the fact that, in our study, there was no data on lymph node status in our

TABLE 3 Comparison of our results with those of the literature.

Author (year)	Mean age (years)			Sex-ratio F/M	Percentage of female patients (%)	Percentage of papillary carcinoma (%)
	Global	Men	Women			
Ozer et al.[8] (2020)	47	-	-	4.10	80.4	93.4
Rego-Iraeta et al.[9] (2009)	46.6	-	-	3.6	78.2	76
Touati et al.[10] (2015)	45.76	56.3	42.4	3.08	76	94
Cătană et al.[11] (2012)	-	49.7	48.9	6.7	87	78.2
Xiang et al.[12] (2010)	44	-	-	3.8	79.1	92.8
Rendl et al.[13] (2017)	51	51.9	48.3	2.9	75	84
Our study	46.4	46	46.5	5.2	83.8	89.1

study in 30.2% of cases. Lymph node dissection was not performed in these cases.

Perithyroid involvement was found in 10.7% of our cases and in 6.8%–15.6% of cases in the literature.[12,13,20]

Capsular effraction was noted in 39.6% of our cases. Similar rates were reported in various studies (33.5%–46.1%).[15,16,20]

In our study, 16.7% of TC presented vascular invasion. In our review of literature, we noted that the angioinvasion rate ranged from 11% to 36.1% of cases.[13,16,20]

Several studies have evidenced that lymphocytic thyroiditis is associated with significantly increased risk of developing TC, especially PTC and PTMC.[21,22] In accordance with the literature, we found that lymphoctic thyroiditis was associated with TC in 28.8% of cases. The mechanisms underlying the association of lymphoctic thyroiditis with TC are still poorly understood. One of the hypotheses is based on the fact that chronic inflammation can produce DNA-induced reactive oxygen species.[22,23] This DNA damage will cause mutations that will eventually lead to the development of PTC.[22,23]

We conducted a Tunisian study investigating the epidemiological and histopathological features of TC in a health care center.

The reduced number of cases is one of the limitations of our study. Large-scale multicentric studies will help overcome these shortcomings.

CONCLUSION

Our study allowed us to investigate cases of thyroid TC in a tertiary health care institution in northern Tunisia and study their epidemiological and clinical features. Our results were consistent with those of the literature and showed a female predominance, higher incidence in the fourth and fifth decades of life, and identified PTC as the most common histological subtype of TC. A high proportion of pT1 and pN0 tumors were noted in our series, suggesting that the diagnosis and management of TC are made at early stages of the disease in our institution. Moreover, our study enabled us to notice the impact of the COVID-19 crisis on the management of TC operated in our institution.

Tunisia is classified among the regions with low incidence of TC in the world. However, the incidence of this disease has increased markedly over the past 20 years. This will encourage us to pay more attention to this carcinoma which, once treated, has a good prognosis. Further studies are needed to establish the epidemiological profile of TC in Tunisia and to evaluate its clinical pathologic features.

AUTHOR CONTRIBUTIONS

Maissa Ben Thayer and Fatma Khanchel involved in conceptualization, drafting, writing, preparing the figures, revising, and editing all aspects of the manuscript. Dorra Chiboub involved in clinical assessment and data collection. Imen Helal, Hedhli Raoueh, Ehsen Ben Brahim, and Raja Jouini involved in data collection, interpretation of submitted material, and revising the manuscript. Aschraf Chadli-Debbiche reviewed and approved the final version of the paper.

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The authors have nothing to report.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

ETHICS STATEMENT

The authors have nothing to report.

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