

CLINICAL AND IMAGING CHARACTERISTICS, TNM STAGING OF PATIENTS WITH CERVICAL LYMPH NODE METASTASES IN PAPILLARY THYROID CANCER AT CAN THO ONCOLOGY HOSPITAL

Pham Minh Chien, Nguyen Hong Phong*

Can Tho University of Medicine and Pharmacy

*Corresponding author: nhphong@ctump.edu.vn

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ABSTRACT

Background: Thyroid carcinomas are the most common endocrine malignancies. The cervical lymph node metastasis rate in patients with PTC ranges from 30-80% and there is a significant difference in survival at 14 years for those with and without lymph node metastases. Therefore, the early detection of metastatic cervical lymph nodes plays an essential role in deciding upon the optimal surgical treatment plan for the majority of patients, which will allow careful postoperative screening, adjuvant therapies, and minimizes the chance of disease recurrence, so we conducted this study. **Objectives:** To evaluate clinical and imaging characteristics, TNM staging of papillary thyroid carcinoma patients with cervical lymph node metastases at Can Tho Oncology Hospital between 2021 and 2023. **Materials and methods:** This was a descriptive cross-sectional study, including 52 patients who underwent total thyroidectomy and therapeutic neck dissection. Evaluating general characteristics such as age, gender, reasons for encounter, thyroid nodule and cervical lymph node characteristics on clinical examination and imaging, cancer staging. **Results:** The average age was 40.0 ± 14.1 years (range 13 - 71). The female/male ratio was 2.5:1. The most common age group was <55 years (86.5%). Half of the patients (50%) were admitted to our institute due to palpable neck mass. The proportion of palpable nodules on clinical examination was three quarters. Nodule locating in a single lobe was the dominant characteristic (about 90%). The TIRADS classifications were TIRADS 5 (55.8%), TIRADS 4 (40.4%) and TIRADS 3 (3.8%). The common location of metastatic cervical lymph node was lateral compartment (86.6%). The absence of central hilar structure shown on ultrasound was 94.2%. Stage I thyroid cancer had the highest rate (84.6%). **Conclusions:** The presence of nodules in a single lobe was the most notable characteristic of thyroid cancer. TIRADS 4 and 5 were shown on ultrasonography in the majority of patients. The lateral compartment was the most common location for metastatic cervical lymph nodes, while the central hilar structure of those nodes mostly absent.

Keywords: thyroid cancer, papillary thyroid carcinoma, cervical lymph node metastases, clinical characteristics, TNM staging.

I. INTRODUCTION

Thyroid carcinomas are the most common endocrine malignancies. The most common thyroid cancer is papillary thyroid carcinoma (PTC) which accounts for over 80% of all thyroid cancers and the cervical lymph node metastasis rate in patients with PTC ranges from 30-80% [1]. Differentiated thyroid carcinoma is usually asymptomatic for a long period and commonly presents as a solitary thyroid nodule and benign thyroid nodules are also typically asymptomatic, giving no clinical clue to their diagnosis [2]. Despite the high incidence of nodal metastases, the overall prognosis is still excellent. In a study conducted on 5897 patients with PTC, of whom only 68 had distant metastases, the results showed that up to 97% of patients survived for 10 years or more [3]. However, an analysis

of more than 9900 patients in the SEER database found a significant difference in survival at 14 years for those with and without lymph node metastases (79% vs. 82%, respectively) [4]. So, the early detection of metastatic cervical lymph nodes plays an essential role in deciding upon the optimal surgical treatment plan for the majority of patients which will allow careful postoperative screening, adjuvant therapies, and minimizes the chance of disease recurrence. The central neck (level VI) and lateral neck (levels II, III, and IV) are at the greater risk for metastasis in PTC patients [5-7]. Since the study of the clinical and imaging presentation, TNM staging of patients with cervical lymph node metastases in papillary thyroid cancer has not been really interested, so we conducted a study “Clinical and imaging characteristics, TNM staging of papillary thyroid carcinoma patients with cervical lymph node metastases at Can Tho Oncology Hospital” with the aim “To evaluate clinical and imaging characteristics, TNM staging of papillary thyroid carcinoma patients with cervical lymph node metastases at Can Tho Oncology Hospital between 2021 and 2023”.

II. MATERIALS AND METHODS

2.1. Materials

2.1.1. Study population

The study was conducted on PTC patients who underwent total thyroidectomy and therapeutic neck dissection at Can Tho Oncology Hospital between March, 2021 and March, 2023.

2.1.2. Inclusion criteria

The inclusion criteria were as follows: (1) Patients were confirmed with PTC by fine needle aspiration of thyroid nodules and regional lymph nodes or patients with suspicious metastatic lymph node by clinical presentation or ultrasonography. (2) Patients had undergone total thyroidectomy and therapeutic neck dissection and had a final pathology of PTC.

2.1.3. Exclusion criteria

The exclusion criteria were as follows: (1) Patients with a history of neck surgery or irradiation. (2) Patients who underwent re-operation for recurrent tumor in the lateral neck after previous central neck dissection. (3) Patients with distant metastasis at the initial presentation.

2.2. Methods

2.2.1. Study design

This was a prospective, descriptive cross-sectional study.

2.2.2. Sample size

The study utilized the sample calculation formula:

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} p(1-p)}{d^2}$$

With: n: was the sample size, $p = 0.043$.

According to a study by Carvalho et al., the recurrence rate of papillary thyroid carcinoma patients underwent surgery was 4.3% [8].

d: is the allowable error, with $d = 0.06$

α : is the design significance level (with $\alpha = 0.05$)

The study was conducted on a total of 52 samples.

2.2.3. Study contents

General characteristics such as age, gender, reasons for encounter. Nodule examination: nodule palpation (palpable or impalpable), location (right lobe, left lobe, isthmus, both lobes), surface (soft or firm, hard), movement (mobile or fixed).

Thyroid ultrasound: number of nodules (solitary nodule, ≥ 2 nodules), site (right lobe, left lobe, isthmus, both lobes), size, TIRADS classification. Lymph node ultrasound: location (central compartment, unilateral compartment, bilateral compartment), central hilar structure (absence, presence). Thyroid carcinoma staging is most performed using the American Joint Committee on Cancer (AJCC) staging system.

2.2.4. Statistical analysis: Statistical analyses were performed using SPSS v 29.0.

2.2.5. Ethics approval

The study was conducted after approving the Ethics Committee of Biomedical Research of Can Tho University of Medicine and Pharmacy.

Research subjects are informed, explained and agreed to voluntarily participate in the study. All personal information and illnesses are kept confidential through computerized encryption to ensure the privacy of study participants.

Ensure fairness and objectivity during data collection and processing.

III. RESULTS

There were 52 patients with thyroid cancer who underwent total thyroidectomy and therapeutic neck dissection. They were qualified for the study. The results were shown as follows.

Table 1. Baseline characteristics of patients

Characteristics		Gender		Total
		Male	Female	
Age (years)	< 55	13	32	45
	≥ 55	2	5	7
Total		15	37	52
Mean (\pm SD) age		40.0 \pm 14.1		
Age range (years)		(13-71)		

In this study, the average age was 40.0 \pm 14.1 years (range 13 - 71). The female/male ratio was 2.5:1. The most common age group was <55 years (86.5%).

Reasons for hospitalization

Half of the patients (50%) were admitted to our institute due to palpable neck mass. 34.6% of the malignant nodules was discovered during a routine physical examination by serendipity on imaging studies. Palpable cervical lymph nodes accounted for 15.6% of the reasons for being present to the hospital.

Table 2. Clinical characteristics of thyroid nodules

Characteristics		Number	Percentage (%)
Nodule palpation	Palpable	39	75
	Impalpable	13	25
Location	Right lobe	18	46.2
	Left lobe	17	43.6
	Isthmus	1	2.6
	Both lobes	3	7.7

Surface	Soft	0	0
	Firm, hard	39	100%
Movement	Mobile	35	89.7
	Fixed	4	10.3

The proportion of palpable nodules on clinical examination was three quarters. Nodules locating in a single lobe was the dominant characteristic, accounting for approximately 90 percent of all nodules (right lobe (46.2) and left lobe (43.6%)). All the palpable nodules were firm or hard and 89.7% of them moved upon swallowing.

Table 3. Characteristics of thyroid nodules on ultrasound

Characteristics		Number	Percentage (%)
Number of nodules	Solitary nodule	29	55.8
	≥ 2 nodules	23	44.2
Location	Right lobe	24	46.2
	Left lobe	22	42.3
	Isthmus	1	1.9
	Both lobes	5	9.6
Size	≤ 20 mm	25	48.1
	20 mm < nodule ≤ 40 mm	22	42.3
	>40 mm	5	9.6
TIRADS	3	2	3.8
	4	21	40.4
	5	29	55.8

The right lobe thyroid nodule and left lobe thyroid nodule were 46.2% and 42.3% respectively. 55.8% of nodules were solitary nodules. Nodule >2 cm but ≤4 cm represented 42.3%, which was nearly equal to the proportion of smaller nodule size (48.1%). The TIRADS classifications were TIRADS 5 (55.8%), TIRADS 4 (40.4%) and only 2 cases of TIRADS 3 (3.8%).

Table 4. Characteristics of cervical lymph nodes on ultrasound

Characteristics		Number	Percentage (%)
Location	Central compartment	7	13.4
	Unilateral compartment	33	63.5
	Bilateral compartment	12	23.1
Central hilar structure	Absence	49	94.2
	Presence	3	5.8

The common location of metastatic cervical lymph node was lateral compartment (86.6%). The absence of central hilar structure shown on ultrasound was about 94%.

Table 5. Cancer stage of patients

Stage groups	Number	Percentage (%)
Stage I	44	84.6
Stage II	5	9.6
Stage III	3	5.8
Stage IV	0	0

Stage I had the highest rate (84.6%). Stage II and Stage III were 9.6% and 5.8% respectively. No record of stage IV thyroid cancer.

IV. DISCUSSION

In our study, the mean age was 40.0 ± 14.1 years, the lowest age was 13 years, and the highest age was 71 years. The group of younger patient age (<55 years) accounted for most patients (86.5%). The ratio of female to male patients was about 2.5:1. Age and age distribution varied between studies. Le Ngoc Phuc reported that the average age was 45.8 ± 12.2 years (range 17 – 70), patients <55 years of age were 77.4% and the sex ratio was 19.7:1 [9]. The most common reason for hospital admission in our study was palpable neck mass (50%), however, thyroid nodule discovered accidentally during a regular medical checkup was the most common reason in the study of Le Ngoc Phuc. Perhaps it was because patients had routine health examinations more frequently.

In the present study, on clinical examination, three-quarters of the nodules were palpable. The prominent feature was nodule location in a single lobe, which accounted for about 90% of all nodules (right lobe (46.2%) and left lobe (43.6%)). 89.7% of the palpable nodules moved when swallowed, and all of them were firm or hard. The results of our study were similar to those of Le Ngoc Phuc, right lobe and left lobe thyroid nodule were 46.5% and 39.5% respectively and 83.7% of nodules moved when the patient swallowed [9]. On ultrasound, thyroid nodules in the right and left lobes were 46.2% and 42.3%, respectively. A solitary nodule makes up 55.8% of all nodules. Nodules larger than 2 cm but less than 4 cm comprised 42.3% of the total, which was almost equivalent to the proportion of smaller nodules (≤ 2 cm). TIRADS categories were TIRADS 5 (55.8%), TIRADS 4 (40.4%), and TIRADS 3 (3.8%). These results were similar to those of Nguyen Tuan Son in terms of nodule location (right lobe (52.6%), left lobe (42.9%)) and number of nodules (the proportion of solitary nodule was 49.4%) [10]. In our study, TIRADS 4 and 5 accounted for the majority (approximately 96%) which was nearly equal to the rate of Le Ngoc Phuc's study. Thus, most of thyroid cancer patients displayed TIRADS 4 and 5 on ultrasonography, but TIRADS 3 still cannot rule out cancer.

On ultrasonography, we found that the lateral compartment was the most prevalent site for metastatic cervical lymph nodes (86.6%) and most of the central hilar structure was absent (94.2%). Our results were higher than those of another author. In Ngo Quoc Duy's study, the lateral compartment comprised approximately three quarters of all locations and the absence of central hilar structure was 84.4% [11]. Nguyen Van Nam reported a much lower rate of the absence of central hilar structure in his study, with only 52.4% [12]. This can be explained by the fact that we studied patients diagnosed with cervical lymph node metastases in papillary thyroid cancer already.

The greatest prevalence was found in stage I (84.6%). Stages II and III had rates of 9.6% and 5.8%, respectively. There was no record of Stage IV thyroid cancer. The study of Le Ngoc Phuc also had an equivalent outcome in which stage I accounted for 82.3% of patients [9].

V. CONCLUSIONS

The presence of nodules in a single lobe was the most notable characteristic of thyroid cancer. TIRADS 4 and 5 were shown on ultrasonography in the majority of patients. The lateral compartment was the most common location for metastatic cervical lymph nodes, while the central hilar structure of those nodes mostly absent.

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