

Comparative Analysis of CT in the Diagnosis of Papillary Thyroid Carcinoma and Nodular Goiter

Guoqiang Ren, Wenhua Liu

The First People's Hospital of Zhenjiang, Jiangsu Province, Zhenjiang, Jiangsu, 212000, China

Abstract: *Objective:* To investigate the Computed Tomography (CT) features of papillary thyroid carcinoma and nodular goiter. *Methods:* Ninety patients were enrolled in this study. All patients were treated with thyroid disease admitted to our hospital from January 2016 to December 2018. Among them, sixty patients with thyroid papillary carcinoma and thirty patients with nodular goiter were examined by CT scan and enhanced examination. *Results:* There was no statistically significant difference in the volume index of left lobe, right lobe and isthmus in thyroid patients ($P>0.05$). There were significant statistical differences in the growth site, morphology, border, density, calcification and enhancement mode of nodules ($P<0.05$). *Conclusion:* CT examination has significant diagnostic value in the differential diagnosis of papillary thyroid carcinoma and nodular thyroid.

Keywords: Papillary thyroid carcinoma, Nodular thyroid, CT imaging features

Publication date: November, 2019

Publication online: 30 November 2019

Corresponding author: Guoqiang Ren, 78037887@qq.com

1 Introduction

With the continuous improvement of medical technology, Computed Tomography (CT) examination technology has been extensively used and great progress has been made in disease diagnosis and differential diagnosis. Thyroid disease is a common clinical disease which occur frequently-among people. With the increasing detection rate of clinical thyroid nodules, some patients with pathological diagnosis of nodular goiter do not need surgery, if the patient

develops symptoms of tracheal compression, surgery is required. Hence it is very important to differentiate between papillary thyroid carcinoma and nodular goiter at the time of diagnosis thereby which helps the physician to proceed with the right treatment. Also, the identification of goiter and thyroid cancer can avoid excessive treatment such as surgery and maximize the optimization of limited medical resources, improve the quality of clinical diagnosis and treatment^[1]. Clinically, CT examination was introduced in the differential diagnosis of thyroid cancer and nodular goiter. By analyzing the characteristics of CT images, the differences between the two diseases were analyzed, and the differential diagnosis of nodular goiter and thyroid cancer were improved^[2]. The highest incidence of thyroid cancer was observed. Papillary carcinoma is foremost requirement while identifying along with goiter. In order to explore the value of CT examination in the differential diagnosis of papillary thyroid carcinoma (PTC) and nodular goiter, our study and results are based on a retrospective comparison analysis in the author's hospital.

2 Data and methods

2.1 General information

In this study, 90 patients were enrolled among the thyroid disease affected patients admitted to our hospital from January 2016 to December 2018, including 60 patients with thyroid papillary cancer, 30 patients with nodular goiter. For example, 45 females and 15 males of thyroid papillary cancer aged 29 to 72 years, with median age (45.81 ± 1.62) years, 12 males and 18 females with nodular goiter, aged 31 to 75 years, median age (46.82 ± 1.81) years old; objective

comparison of 2 sets of basic data, suggesting no comparative value ($P>0.05$).

Inclusion criterias: (1) All patients with papillary thyroid carcinoma in the group met the diagnostic criteria for the disease, and the patients were diagnosed by surgical pathology (2) the selected patients underwent CT scan and enhanced scan before surgery; 3) The development of this research topic is authorized by the patient and the author's ethics association^[3].

2.2 Methods

Ninety patients underwent CT scan, with 256-layer Philips and 64-story Siemens multi-slice spiral CT examination, scanning the hyoid bone horizontally to the aortic arch, setting the layer thickness to 3 mm and pitch to 2 mm performing continuous scanning without interruption. During the plain scan, patient's peripheral venous bolus was injected with 80ml Visipaque enhanced scanning. It was scanned in two phases arterial phase and venous phase. the CT features of the lesion were observed during plain scan and enhancement. All CT images are independently diagnosed by three doctors with titles of deputy director or above in the imaging department. In case of any disagreement, a consensus should be reached through consultation. The main evaluation indexes include lesion location, size, scope, density, boundary, calcification, surrounding tissue relationship, nodule volume and anteroposteriod diameter.

2.3 Statistical analysis

Statistical software SPSS23.0 version of the objective data analysis, $P<0.05$ was statistically significant.

3 Results

3.1 Comparison of papillary thyroid carcinoma and nodular thyroid volume

The left and right lobe gland volume, and isthmus thickness of thyroid cancer patients were (14.01 ± 2.62) cm^3 , (15.85 ± 3.51) cm^3 , (0.81 ± 0.21) cm, respectively. The corresponding indexes of nodular goiter were (16.83 ± 2.94) cm^3 , (15.81 ± 2.43) cm^3 , (0.76 ± 0.20) cm and there were no significant differences among the two groups ($P>0.05$).

3.2 CT image features of papillary thyroid carcinoma and nodular goiter

Cancer nodules shows more irregularity while the boundary is clear on plain and the boundary itself is less

clear on enhancement. Among the 60 cases of thyroid papillary carcinoma, all of them had invasive growth, and about 87.2% of the thyroid carcinoma patients showed the sign of bite cake after enhancement; none of the 30 patients with nodular goiter broke the capsule; the lesions in patients with nodular goiter were clear, and most of the lesions were more clearly defined after the enhanced scan, and very few borders were unclear.

There was a difference in the density of thyroid papillary carcinoma and nodular goiter. The internal density of thyroid cancer was uniform (13.33%), and the internal density of nodular goiter was uniform (36.67%). Only 2 cases of papillary thyroid carcinoma showed clear nodule boundaries, and nodular goiter showed clear boundaries. Calcification occurs in both papillary thyroid carcinoma and nodular goiter, papillary carcinoma is mostly fine sand-like calcification, goiter is mostly coarse calcification. goiter is mostly coarse calcification. The incidence of calcification in both cases was related to the size of the lesion and the time of occurrence of the lesion.

4 Discussion

Papillary thyroid carcinoma and nodular thyroid are common malignant and benign nodules. There are various factors influencing the disease and may not occur among a certain age limit. With the increasing radioactivity exposure in daily life and the increase of iodine intake, the incidence of thyroid is significant. The incidence of thyroid disease has risen remarkably and has become one of the major public health problems of concern to the society. The incidence of thyroid cancer is also related to pressure at work and life of patients. Nodular goiter needs to meet the surgical indications for surgical treatment and Malignant diagnosis is not excluded as the main indication of surgery^[4]. With the rapid development of clinical diagnostic techniques, there is a better detection method for the identification of benign and malignant nodules. CT examination is a commonly used examination method in clinical practice. When the thyroid tissue is cancerous, the lesions grow invasively. The obvious low-density area can be seen in CT imaging. After the enhancement, the boundary is not clear, and the bite cake sign is present. The aspect ratio is ≥ 1 . It can be used to identify effective benign and malignant nodules^[5].

This study showed that there was no statistically significant difference in the left lobes, right lobe, and isthmus volume of thyroid patients ($P>0.05$).

Thyroid cancer patient observation shows us invasive growth, enhanced border deficiencies, larger growth or marginal breakthrough of the capsule. While patients with nodular goiter mostly shows expansive growth, clear boundaries. Thyroid cancer patients were shown invasive growth mode, enhancement in performance was obvious while scanning, only a few borders were clear. In patients with nodular goiter, only a few borders were unclear, and most of them had clear and expansive growth with clear boundaries. The boundary was clear and not broken through the capsule. In this group of patients, only 2 cases of thyroid cancer showed clear nodule boundaries and the nodular goiter showed clear boundaries. When the lesion is small, the incidence of calcification of papillary thyroid carcinoma is higher than that of goiter, and it is mainly small calcification. The nodular goiter is mainly composed of coarse calcification. In CT imaging, there were significant imaging differences between the two diseases.

In summary, CT examination has significant diagnostic value in the differential diagnosis of papillary thyroid carcinoma and nodular goiter.

References

- [1] Zhao R, Zheng SS, Zhao H., et al. Diagnostic value of CT plain scan in nodular goiter and papillary thyroid carcinoma[J]. *Journal of Practical Radiology*, 2018, 34(6):835–8.
- [2] Zou YL, Li ZJ, Qi Q., et al. Comparison of MSCT signs between small papillary thyroid carcinoma and nodular goiter[J]. *Chinese Journal of CT and MRI*, 2017, 15(11): 49–52.
- [3] Cao HH, Zheng SS, Xiang L., et al. CT differential diagnosis of nodular goiter and papillary thyroid carcinoma[J]. *Chinese Journal of General Practice*, 2014, 12(10):1694–6.
- [4] Zhu MP, Zhou XY, Han ZJ, et al. The value of different CT signs and their combined application in the diagnosis of papillary thyroid carcinoma[J]. *Chinese Journal of Clinical Medical Imaging*, 2014, 25(12):840–3, 855.
- [5] Wang CW, Chen SP, Huang S., et al. Diagnostic value of spiral CT for papillary thyroid carcinoma and nodular goiter[J]. *Modern Practical Medicine*, 2016, 28(4):467–8.