

● *Original Contribution*

HIGH RISK OF LATERAL NODAL METASTASIS IN LATERAL SOLITARY SOLID PAPILLARY THYROID CANCER

XING-JIAN LAI, BO ZHANG, YU-XIN JIANG, JIAN-CHU LI, RUI-NA ZHAO, XIAO YANG, QING ZHANG, XIAO-YAN ZHANG, WEN-BO LI, and SHEN-LING ZHU

Department of Ultrasound, Chinese Academy of Medical Sciences and Peking Union Medical College Hospital, Beijing, China

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Abstract—We explored the relationship between ultrasonic intra-thyroidal location and neck node metastasis pattern in solitary solid papillary thyroid cancer (PTC). Data on 186 patients were retrospectively reviewed. The association between several characteristics and neck node metastasis pattern were analyzed. Among the 186 thyroid nodules, age ≥ 45 y ($p = 0.005$), mass size ≥ 2 cm ($p = 0.001$), presence of calcifications ($p < 0.001$) and lateral nodal metastasis ($p = 0.001$) were significantly related to central nodal metastasis in multivariate analysis. Mass size ≥ 2 cm ($p = 0.046$) and central nodal metastasis ($p = 0.002$) were significantly related to lateral nodal metastasis in multivariate analysis. Location of an intra-thyroidal solitary solid PTC located non-adjacent to the trachea (lateral) was significantly related to lateral nodal metastasis ($p = 0.043$) compared with location of an intra-thyroidal solitary solid PTC adjacent to the trachea (medial or isthmus). Lateral lesions have a high risk of lateral nodal metastasis in solitary solid PTC. (E-mail: yuxinjiangxh@163.com) © 2016 Published by Elsevier Inc. on behalf of World Federation for Ultrasound in Medicine & Biology

Key Words: Papillary thyroid carcinoma, Cervical metastasis, Node metastatic pattern, Ultrasonography.

INTRODUCTION

Papillary thyroid cancer (PTC) is a common disease with an increasing incidence (Hundahl et al. 1998). Metastases to neck lymph nodes are common, affecting as much as 80% of PTC patients (Lee et al. 2008; Roh et al. 2008a). The presence of lymph node metastases significantly increases the locoregional recurrence rate (Mercante et al. 2009). Thus, the pre-operative detection of neck lymph node metastases, including a pre-operative ultrasound evaluation, is very important. Identification of patients with a high risk of neck lymph node metastases may lead to more detailed examination of neck lymph nodes and reduce the rate of re-operation.

Several studies have reported factors predictive of neck lymph node metastases in PTC (Hunt et al. 2011; Koo et al. 2009a, 2009b; Kupferman et al. 2008; Kwak et al. 2009; Lee et al. 2008, 2015; Roh et al. 2008b; Xiao and Gao 2010). However, few studies have

assessed the relationship between the location of PTCs and neck node metastasis patterns (Hunt et al. 2011; Kwak et al. 2009; Lee et al. 2015). Kwak et al. (2009) and Hunt et al. (2011) found that a tumor location in the upper pole was an independent factor predictive of lateral lymph node metastases. Lee et al. (2015) reported that the posterosuperior location of intra-thyroidal solitary PTC has a high risk of lateral and central nodal metastasis compared with other locations. However, for the relationship between neck lymph node metastases and intra-thyroidal locations, such as adjacent or non-adjacent to the trachea, there has been no definitive conclusion to date. Therefore, we assessed the relationship between several characteristics, including intra-thyroidal location and neck node metastasis pattern, in solitary solid PTC.

METHODS

Patients

The Peking Union Medical College Hospital ethics committee approved this retrospective study, and informed patient consent was not required. The records of 305 consecutive PTC patients who underwent total or subtotal thyroidectomy with or without neck dissection at Peking

Address correspondence to: Yu-Xin Jiang, Department of Ultrasound, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Shuaifuyuan 1, Wangfujing, Beijing 100730, China. E-mail: yuxinjiangxh@163.com

Union Medical College Hospital between October 2012 and April 2014 were retrospectively reviewed. Only cases with available pre-operative ultrasound sonograms and surgical pathologic results were included. Multifocal cases, recurrent cases, cases with cystic composition, cases with extrathyroidal extension and cases with distant metastasis were excluded.

Certain sonographic features of a thyroid nodule and combinations of features have high predictive value for malignancy, including a shape taller than wide, irregular infiltrative margins, an absent halo, nodule hypo-echogenicity, presence of microcalcifications, increased intra-nodular vascularity (detected by color Doppler or power Doppler), harder than normal thyroid parenchyma (detected by elastography) and presence of suspicious cervical lymphadenopathy. Sonographic features suggestive of suspicious cervical lymphadenopathy include a rounded rather than oval shape, hypo-echogenicity, loss of the fatty hilus, cystic change, calcifications and peripheral vascularity (American Thyroid Association [ATA] Guidelines Taskforce on Thyroid Nodules and Differentiated Thyroid Cancer et al. 2009). Patients with thyroid nodules with one or more of the aforementioned features underwent fine-needle aspiration or surgery.

A total of 186 intra-thyroidal solitary solid PTCs with or without nodal metastasis were included in this study. For all patients, anterior compartment neck dissection was performed, and ipsilateral level II–V selective neck dissection was conducted for lateral nodal metastasis in cases that were confirmed by ultrasonography and fine-needle aspiration biopsy.

Imaging and image analysis

Ultrasonography was performed using a 5- to 12-MHz linear array transducer (iU22, Philips Medical Systems, Bothell, WA, USA) or 8- to 15-MHz linear array transducer (Acuson Sequoia, Siemens Medical Solutions, Mountain View, CA). All pre-operative sonograms were interpreted by two experienced radiologists (B.Z. and XJ.L.) by consensus. Each of the radiologists had more than 8 y of thyroid sonography experience and was blinded to the clinical information and pathologic results. The maximal diameter was recorded as the tumor size. Calcification information was recorded, including microcalcification and macrocalcification. If the margin of a nodule reached the capsule of the thyroid in any view of sonography, the nodule was categorized as positive for capsule invasion.

For the intra-thyroidal location, both the right and left lobes of the thyroid were equally divided into medial (M) and lateral (L) portions (Figs. 1 and 2). Nodules occupying the M portion of the right lobe were symbol-

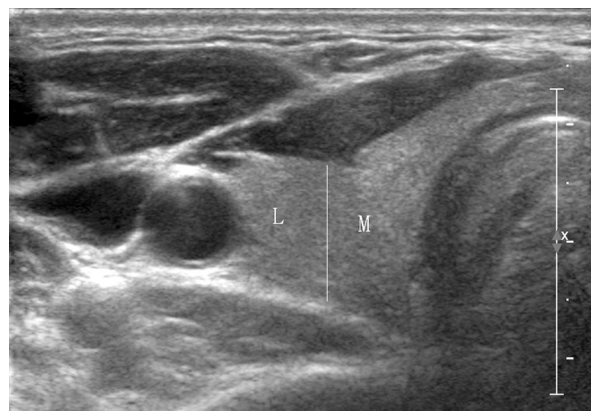


Fig. 1. Ultrasonographic axial view of the right thyroid lobe. The axial view of the right lobe was equally divided into the medial (M) and lateral (L) portions.

ized as MR, and nodules occupying the M portion of the left lobe were symbolized as ML. Nodules occupying the isthmus were symbolized as I. MR, ML and I were categorized as adjacent to trachea nodules. Similarly, nodules occupying the lateral portion of the right lobe were symbolized as LR, and nodules occupying the lateral portion of the left lobe were symbolized as LL. LR and LL were categorized as non-adjacent to trachea nodules. If the solitary nodule occupied both the M and L portions, it was symbolized as T. T nodules were not enrolled in the analysis of the relationship between intra-thyroidal location and neck nodal metastasis pattern.

For neck node metastasis pattern, surgery-confirmed lymph node metastases were classified as central or lateral nodal metastases. The central lymph node was located at level VI, which contains the thyroid gland and the adjacent region bordered

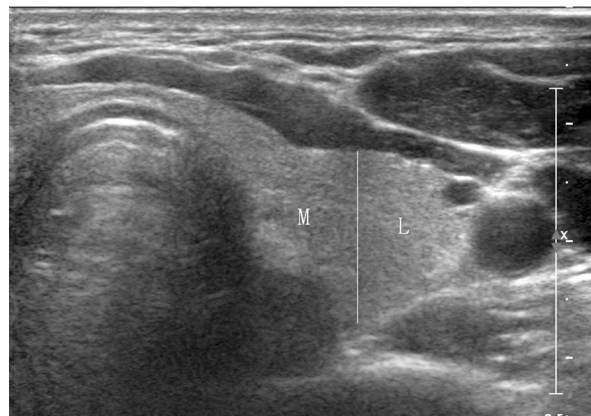


Fig. 2. Ultrasonographic axial view of the left thyroid lobe. The axial view of the left lobe was equally divided into the medial (M) and lateral (L) portions.

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