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Risk factors and indication for dissection of right paraesophageal lymph node metastasis in papillary thyroid carcinoma

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Abstract

Background: Right paraesophageal lymph nodes (RPELNs) are located behind right recurrent laryngeal nerve which often ignored in central compartment lymph nodes (LNs) dissection of papillary thyroid carcinoma (PTC) patients. The aim of this study was to identify the risk factors for RPELN metastasis and indications for RPELN dissection.
Methods: Medical record of 246 consecutive PTC patients (194 female, 52 male), who underwent total thyroidectomy (244 patients) or right lobectomy (2 patients) with central compartment LN dissection (13 ipsilateral and 233 bilateral), were reviewed. The RPELNs were kept separately during the operation. The clinical pathology data was collected and analyzed.
Results: RPELN metastasis was confirmed in 33 patients (13.4%) and were discovered in 18.5% (31/168) of right lesion, 34.4% (31/90) of right central group LN (rCLN) metastasis, 33.3% (18/54) of lateral compartment LN (LLN) metastasis, 25.7% (9/35) of local recurrent patients respectively. The ultrasound suspected metastatic LNs, tumor diameter, tumor number, tumor location, and numbers of metastatic Delphian LNs, central group LNs (CLNs), rCLNs, and LLNs between patients with and without RPELN metastasis showed significant differences in univariate analysis ($P < 0.05$). In multivariate analysis, number of metastatic rCLNs (1–2: OR 13.6, 95% CI, 2.7–67.5; ≧3: OR39.4, 95% CI, 7.7–200.9), right side tumor (OR 6.4, 95% CI, 1.1–35.6), and three or more metastatic LLNs (OR 3.5, 95% CI, 1.2–10.2) were independent risk factors for RPELN metastasis.
Conclusions: PTC patients with right lobe lesions, especially with potential rCLN metastasis, are at considerable risk of RPELN metastasis. RPELN dissection should be considered in these patients.

Keywords: Right paraesophageal lymph node (RPELN); Papillary thyroid carcinoma (PTC)

Introduction

Papillary thyroid carcinoma (PTC) accounts for approximately 90% of all primary thyroid tumors. The incidence of PTC has been increasing rapidly in recent years, and in some countries PTC has become the most common malignant disease.[1] Patients diagnosed with PTC have a good prognosis after successful surgical removal of the tumor owing to the slow progression of the disease[2]; the reported 10-year survival rate is 93%.[3] However, lymph node metastasis is common in PTC, especially in the neck area. Positive lymph nodes have been reported in 20%–90%[2,4,5] of PTC cases, and central neck recurrence accounts for 74% of all recurrent cases,[6] although the central neck local-regional recurrence may vary from 0 to 20%.[7]The prognostic importance of regional lymph node metastasis remains controversial, one large study suggested that regional lymph node metastasis could be the second most

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important independent prognostic factor, after distant metastasis, for PTC patients.[8] The prophylactic central neck dissection is controversial for PTC patients,[9,10] however, incomplete lymph node dissection may result in increased recurrence,[6,8] reoperation, and reoperation-associated complications.[11] Therefore, complete dissection of lymph nodes should be considered in the surgical treatment of newly-diagnosed patients with PTC.

Lymph node metastasis in PTC patients usually occurs first in the central lymph node compartment of the neck and then moves to the lateral compartment, although the tumor cells will occasionally skip to the lateral compartment, leaving the central compartment tumor-free.[5,12–14] Therefore, dissection of central compartment lymph nodes should be a top priority in lymph node dissection for PTC patients.[15]According to American Thyroid Association (ATA) guidelines,[15] the central compartment is sub-divided into prelaryngeal (Delphian) lymph nodes, pretracheal lymph nodes, and paratracheal lymph nodes. Left recurrent laryngeal nerve is located between the esophagus and trachea, but right nerve ascends through the fat tissue of the right central compartment. Although the paratracheal nodes may be anterior as well as posterior to the recurrent laryngeal nerves, because of anatomical differences, larger amount of fat tissue including lymph nodes may exist posterior to the right nerve than to the left nerve. These nodes are located in the space among the posterior side of the right nerve, esophagus and prevertebral fascia, which is also called right paraesophageal lymph nodes (RPELNs)[15–17](Fig. 1).

The reported prevalence of RPELN metastasis varied from 5.76% to 26%.[16–20] Concerning the relatively low prevalence of RPELN metastasis and the potential dissection associated complication, whether and when RPELNs should be dissected remains controversial. Several recent studies tried to identify the risk factors for RPELN metastasis.[16–20] However, some studies included patients with right lobe thyroid lesions only,[16,17,20] while other studies lacked multivariate analysis.[18,19]

The current study included both right lobe and non-right lobe PTC patients, containing both newly diagnosed patients and locally recurrent cases, for multivariate analysis and aimed to answer the following questions: (1) how often does RPELN metastasis occur; (2) what are the risk factors for RPELN metastasis in PTC patients and when should RPELN dissection should be considered; and (3) whether the procedure of RPELN dissection is safe or not.

Patients and methods

A retrospective study was performed based on 246 consecutive PTC patients (52 males and 194 females) who underwent surgical treatment by one surgical team at general surgery department of Peking Union Medical College Hospital from September 2010 to August 2013. Both newly diagnosed patients (211) and recurrent/persistent patients (35) were enrolled. Of all patients, 103 had microcarcinoma (diameter≦1 cm, 20 patients with cN1). The study was approved by the Ethics Committees of Peking Union Medical Hospital, and all participants gave informed consent.

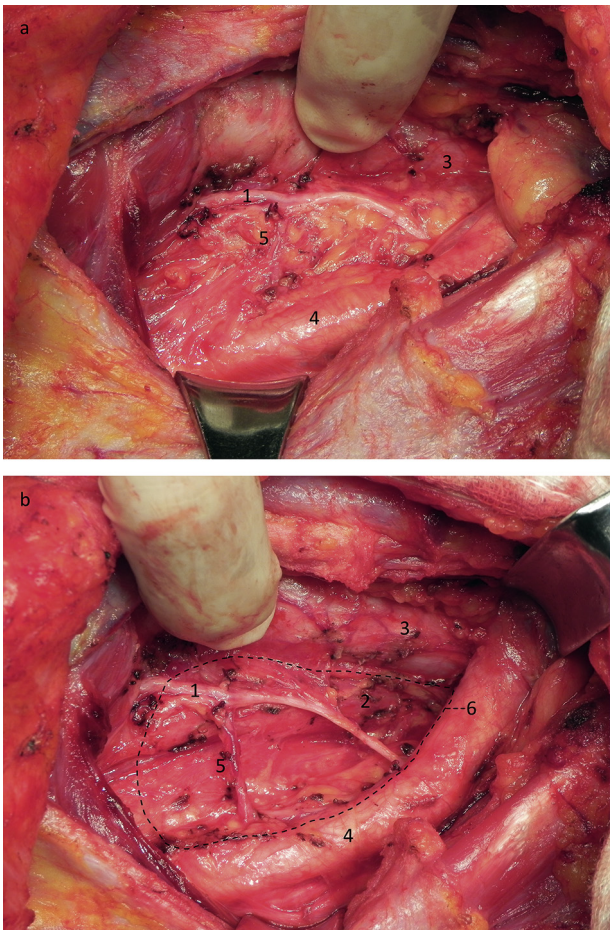

Figure 1. Schematic representation of RPELN dissection.**(a)** Before RPELN dissection and **(b)** After RPELN dissection: **1**. Right recurrent laryngeal nerve; **2**. Esophagus; **3**. Trachea; **4**. Carotid artery; **5**. Inferior thyroid artery; and **6**. RPELN.

The ultimate extent of resection was total thyroidectomy with bilateral central compartment lymph node dissection for 233 cases, total thyroidectomy with right central compartment lymph node dissection for 11 cases, and right lobectomy with right central compartment lymph node dissection for two cases. Additionally, 57 patients underwent modified radical neck dissection for N1b disease in the lateral compartment.

The central compartment was defined according to American Thyroid Association's consensus of central neck dissection[15] and divided into the following four parts according to Bae's method[16]:(1) Delphian lymph node; (2) right central lymph node (rCLN); (3) left central lymph node (lCLN); and (4) RPELN. The pretracheal and paratracheal lymph nodes were combined into the central lymph node (CLN) group and divided along the median into