Traditional surgery for thyroid nodule is usually performed via anatomic localization of the recurrent laryngeal nerve (RLN), inferior thyroid artery and parathyroid glands (PTGs) initially. Due to the RLN constantly lying beneath the thyroid gland and low grade malignancy of well-differentiated thyroid cancer (WDTC), it is not necessary to find the nerve initially and impossible to make too deep resection. From May 1998 to July 2005, 33 patients with WDTC underwent total thyroidectomy along the capsule with or without modified radical neck dissection without identifying the RLN and PTGs initially. The isthmus, capsular vessels and Berry’s ligament were cut from above and the RLN could be found lying in the surgical bed. The PTGs could be found when the thyroid was retracted medially and removed. The patients were followed-up until December 2007. The safety of the method, complications and clinical outcomes were evaluated. For the patients with WDTC, only one patient (3%) had transient vocal palsy. Incidental parathyroidectomy was found in six (18%) patients, resulting in two (6%) with temporary and two (6%) with permanent hypocalcemia. Only one 86-year-old woman died of disease recurrence; the other patients remained disease-free. Total thyroidectomy for WDTC without identifying the RLN and PTGs initially is an easy and safe alternative method. [J Formos Med Assoc 2009;108(6):508–512]

Key Words: hypocalcemia, total thyroidectomy, vocal palsy
thyroid cancer (WDTC). We tried to remove all the thyroid tissue along the capsule without identifying the RLN initially for WDTC. The safety of the method, complications and clinical outcomes were evaluated.

**Patients and Methods**

From May 1998 to July 2005, 33 patients with WDTC underwent total thyroidectomy at the Department of Otolaryngology, National Taiwan University Hospital, performed by the same surgeon (JY Ko). Some of the patients with neck metastases were referred from the Department of Otolaryngology, Taipei City Hospital, Zhongxing Branch. Preoperative fine needle aspiration cytology was performed for the thyroid nodule or neck mass. If cytology showed papillary thyroid cancer or metastatic papillary cancer in the lymph node, total thyroidectomy with or without modified radical neck dissection (MRND) was performed after computed tomography scanning. One patient suffered from follicular carcinoma after tumor excision at the Taipei City Hospital, Zhongxing Branch, and one woman had recurrent follicular carcinoma and was referred for total thyroidectomy.

Under general anesthesia, a skin incision along the lower neck was made to separate the strap muscles and expose the thyroid gland. The isthmus was divided and the lesion lobe was dissected from the surrounding normal tissue along the thyroid capsule first without identifying the RLN and PTGs initially (Figure 1). The capsular vessels of the inferior and superior thyroid arteries and veins were ligated and cut near the thyroid capsule (Figure 2). Berry’s ligament was resected with a bipolar electrocauterizer from above and the RLN could be found lying in the surgical bed (Figure 3). The PTGs could be found when the thyroid was retracted medially and removed (Figure 4). A similar procedure was done in the other lobe. If the section margin was involved by the cancer or neck lymph node metastases were proved by pathologic examination, postoperative $^{131}$I treatment was given.

All cancer patients were followed-up by endocrinologists and otorhinolaryngologists until December 2007. Postoperative vocal palsy (VP), hypocalcemia and patient survival were evaluated.

**Results**

The demographic characteristics, pathologic status, complications and clinical outcomes of the
33 patients with WDTC are shown in the Table. Around two-thirds of the patients were women. The youngest and oldest patients were 16 and 86 years old, respectively. There were 17 (52%) patients older than 45 years.

All the pathology showed WDTC, and almost all (94%) were papillary type. One third of the patients had multiple cancer nodules in bilateral lobes and 15 (45%) patients underwent MRND because of lymph node involvement with a median of four nodes (range, 1–39). We performed bilateral MRND in two of the 15 patients. One 28-year-old man had 17 and 22 metastatic lymph nodes in the right and left necks, respectively. Two women had advanced papillary cancer involving the hypopharynx, and they underwent total thyroidectomy plus near total laryngectomy. Only one patient (3%) suffered from transient VP after total thyroidectomy. Incidental parathyroidectomy was found in six (18%) patients, with one and two PTGs resected in three patients each. Two of three patients suffered from permanent hypocalcemia after two PTGs were resected, and two of three patients had normal serum calcium level after one PTG was removed.

Table. Demographic characteristics, pathological status and clinical outcomes of the thyroid cancer patients

<table>
<thead>
<tr>
<th>Sex</th>
<th>12 (36%)</th>
<th>21 (64%)</th>
</tr>
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<tbody>
<tr>
<td>Age</td>
<td>16–86 yr</td>
<td>(mean, 46.7 yr)</td>
</tr>
<tr>
<td>Cell type</td>
<td>Papillary 31 (94%)</td>
<td>Follicular 2 (6%)</td>
</tr>
<tr>
<td>Lobe involved</td>
<td>Unilateral 22 (67%)</td>
<td>Bilateral 10 (33%)</td>
</tr>
<tr>
<td>Lymph node metastasis</td>
<td>Positive 15 (45%)</td>
<td>Negative 18 (55%)</td>
</tr>
<tr>
<td>Number of positive lymph nodes</td>
<td>1–39 (median, 4)</td>
<td></td>
</tr>
<tr>
<td>Temporary vocal palsy</td>
<td>1 (3%)</td>
<td></td>
</tr>
<tr>
<td>Incidental parathyroidectomy</td>
<td>6 (18%)</td>
<td></td>
</tr>
<tr>
<td>Permanent hypocalcemia</td>
<td>2 (6%)</td>
<td></td>
</tr>
<tr>
<td>¹³¹I treatment</td>
<td>27 (82%)</td>
<td></td>
</tr>
<tr>
<td>Disease-free survival</td>
<td>32 (97%)</td>
<td></td>
</tr>
</tbody>
</table>
Transient hypocalcemia developed in the other two cases. The incidentally resected PTG was tightly adhesive to the papillary cancer and intermingled with fatty tissue. It was difficult to separate the PTG from the cancer tissue even under microscopy.

Twenty-seven (82%) patients received postoperative $^{131}$I treatment. Only one 86-year-old woman died of disease recurrence. The other patients remained disease-free after a follow-up that ranged from 19 months to 115 months.

**Discussion**

The relationship between the facial nerve and the parotid gland is different from that between the RLN and the thyroid gland. The facial nerve runs into the parotid gland and the parotid tumor may be located superficially or deeply to the facial nerve. Before removing the parotid tumor, we must identify the facial nerve first and check the relationship between them. If the tumor resides superficially to the nerve, we remove all the superficial lobe and the tumor, otherwise, we elevate the facial nerve and remove the tumor deep to it.\(^4\) Although the course of the RLN *per se* is variable,\(^5\)–\(^7\) it lies constantly beneath the thyroid gland.\(^3\) Before identifying the distal part of the RLN, we must separate the thyroid gland from the underlying non-thyroid tissue. Therefore, careful separation of the thyroid gland from the underlying tissue along the extracapsular plane will find the PTGs and RLN, especially under Berry’s ligament. Meanwhile, the total lobectomy has been finished. Monfared et al reported that because of extreme variability of the ITA and the RLN, it is suggested that the artery be ligated either proximally or at its tertiary branches on thyroid capsule.\(^6\) Strict dissection along the extracapsular plane will ligate the tertiary branches of the ITA and not disturb the blood supply of the RLN and PTGs. From the anatomical point of view, our method without identifying the RLN from the lower tracheoesophageal groove initially is reasonable.

The reported rates of RLN palsy and hypoparathyroidism in the literature vary from 0% to 4% for permanent RLN injury, and from 0.5% to 11.0% for permanent hypoparathyroidism.\(^9\)–\(^12\) In our series, only one cancer patient (3%) suffered from temporary VP. The complication rate was similar to that reported by the Department of Otolaryngology–Head and Neck Surgery, Kaohsiung Medical University. Total lobectomy with routine RLN identification was a basic procedure in their Department. The rate of temporary/permanent VP was 2.0%/0.7% for patients with thyroid cancer.\(^2\)

Incidental parathyroidectomy was noted in six (18%) patients, and only two (6%) had permanent hypoparathyroidism. Gourgiotis et al reported that there was no association between inadvertent parathyroidectomy and postoperative hypocalcemia.\(^13\) In the pathological picture, the PTG was tightly adhesive to the papillary cancer and difficult to separate from the cancer even under microscopy. Sometimes, incidental parathyroidectomy was inevitable during total lobectomy for the invasive cancer.

In this study, there were 10 (33%) patients with multiple cancer nodules found in bilateral lobes after pathologic examination. The role of total thyroidectomy in the management of WDTC is evident. The advantages of total thyroidectomy include the adequate treatment of tumor multifocality, reduction in local recurrence rates and anaplastic transformation, and creating a suitable environment for radioactive iodine scanning and treatment of metastases. The benefits of this procedure have to be weighed against the potential but minimal morbidity.\(^14\)

**References**