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## ORIGINAL ARTICLE

# Optimal extent of prophylactic central neck dissection for papillary thyroid carcinoma: Comparison of unilateral versus bilateral central neck dissection

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**KEYWORDS**

central neck dissection;  
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**Summary Objective:** The aim of the study was to determine the optimal extent of prophylactic central neck dissection (pCND) in papillary thyroid carcinoma (PTC).

**Materials and methods:** We studied 384 patients with clinically node-negative unilateral PTC who had undergone total thyroidectomy with pCND. Of these, 169 patients underwent unilateral pCND, and 215, bilateral pCND.

**Results:** Age, sex, and TNM stage did not differ between the two groups. The rates of occult central lymph node metastasis were 34.3% and 37.2% in the unilateral and bilateral pCND groups, respectively ( $p = 0.558$ ). Metastasis to the contralateral paratracheal lymph node occurred in 4.2% of the bilateral pCND group. Major complication rates did not differ between the two groups, except for transient hypoparathyroidism, which was higher in the bilateral group (43.7% vs. 33.7%,  $p = 0.047$ ). Stimulated thyroglobulin and RAI ablation uptake rates were similar in the two groups, as were recurrence and disease-free survival.

**Conclusion:** Contralateral paratracheal node dissection may be not indicated for prophylactic central neck dissection in clinically node-negative unilateral PTC because the rate of contralateral paratracheal node metastasis is low and transient hypoparathyroidism is higher following bilateral dissection.

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## 1. Introduction

Papillary thyroid carcinoma (PTC) accounts for > 80% of all thyroid malignancies.<sup>1</sup> It is generally slow-growing and the overall prognosis is excellent, with 5-year, 10-year, and 20-year survival rates of 94%, 89%, and 87%, respectively.<sup>1,2</sup> Cervical lymph node metastasis occurs frequently in PTC and is an unfavorable prognostic factor, especially in patients over 45 years.<sup>3–5</sup>

The central neck compartment is considered to be the primary echelon of lymph node metastasis in PTC. The occult metastasis rate ranges from 20% to 90% in patients who have undergone prophylactic central neck dissection (pCND).<sup>6–8</sup>

Although PTC has an excellent prognosis, locoregional recurrence has been reported in up to 30% of patients. It is related to increased morbidity and mortality rates, and a poor prognosis.<sup>9–11</sup> Locoregional recurrence was more frequent in patients with lymph node metastasis than in those without it.<sup>12</sup> Also, extracapsular spread of metastatic lymph nodes and maximal extrathyroidal extension of tumors are important prognostic factors for locoregional recurrence in PTC.<sup>13,14</sup>

Therapeutic central neck dissection should be carried out in patients with clinically node-positive PTC.<sup>8</sup> However, pCND remains controversial in patients with node-negative PTC because of a lack of substantial evidence of the benefit, and the potential morbidity of the procedure.<sup>15,16</sup> Some expert thyroid surgeons prefer to perform pCND because occult micrometastasis is common and pCND can be performed safely without extending the incision during the initial thyroidectomy and may decrease lymph node recurrence.<sup>17–19</sup> Also pCND provides more accurate staging for decisions regarding adjuvant RAI ablation.

Besides the controversy regarding pCND itself, the optimal extent of pCND is also controversial. There is no consensus on the extent of pCND (unilateral vs. bilateral). The aim of this study was to determine the optimal extent of pCND in patients with PTC by comparing unilateral pCND with bilateral pCND in terms of surgical outcomes, complications, recurrence, and survival.

## 2. Materials and methods

Between January 2001 and December 2011 in our institute, 953 patients underwent thyroidectomy for PTC. Of them, 814 (85%) underwent total thyroidectomy and 139 (15%) underwent thyroid lobectomy. In terms of CND, 729 (76.5%) underwent CND with thyroidectomy (therapeutic CND in 91 cases and prophylactic CND in 638 cases), and 224 (23.5%) did not undergo CND. We excluded patients who did not undergo pCND with thyroidectomy. We also excluded cases with other pathologic types of thyroid cancer, bilateral PTC, recurrent cases, or distant metastasis, and patients who underwent thyroid lobectomy, concurrent lateral neck dissection, or therapeutic CND. Finally, 384 patients with clinically node-negative unilateral PTC who had undergone total thyroidectomy with pCND were included in this study. The Institutional Review Board of Hanyang University Hospital approved this study.

Preoperative physical examination, ultrasonography (US) and computed tomography (CT) were performed in all

patients, and there was no evidence of metastatic cervical lymph nodes on preoperative physical examination, US, and CT. All patients were diagnosed with PTC by preoperative ultrasonography-guided fine needle aspiration cytology (FNAC).

The extent of pCND was decided by surgeon's preference in our institute. Of 384 patients studied, 169 underwent total thyroidectomy with unilateral pCND, and the other 215 underwent total thyroidectomy with bilateral pCND. In bilateral pCND, pretracheal, prelaryngeal, and bilateral paratracheal lymph nodes were removed, and in unilateral pCND, pretracheal, prelaryngeal, and ipsilateral paratracheal lymph nodes were removed.

We compared age, tumor size, multifocality, extrathyroidal extension (ETE), lymphovascular invasion, occult lymph node metastasis rate, complications, recurrence, and survival rate between the two groups. ETE was classified into minimal and maximal ETE. We defined minimal ETE as extension of the primary tumor to the strap muscles or perithyroidal soft tissue, and maximal ETE as extension to surrounding structures such as trachea, esophagus, recurrent laryngeal nerve (RLN), or larynx. Radioactive iodine (RAI) ablation was performed in most cases of maximal ETE or tumors > 4cm, and also in selected patients with minimal ETE or cervical lymph node metastasis, and tumor size 1–4 cm and/or higher risk histologic features similar to the American Thyroid Association (ATA) guidelines.<sup>8</sup> The RAI ablation dose ranged from 30 mCi to 150 mCi. Hypoparathyroidism was defined as any decrease of intact parathyroid hormone below the normal range regardless of hypocalcemic symptoms including tingling sensation, tetany, Chvostek's sign, and Trousseau's sign. It was considered permanent hypoparathyroidism if the decrease of intact parathyroid hormone persisted for > 6 months. Flexible fiberoptic laryngoscopy was performed routinely in all patients on the day before surgery and at 1 day after the operation. It was repeated serially if necessary. Recurrent laryngeal nerve palsy was considered permanent if it lasted > 6 months. Intraoperative neuro-monitoring was not used in this study. Recurrence was defined as a new structural abnormality on imaging studies such as neck US, CT, or whole-body iodine scan. Neck US, whole body iodine scan, and stimulated or suppressed thyroglobulin (Tg) measurements were performed at 6–12 month intervals to detect recurrence after surgery.

Statistical analysis was performed using SPSS version 22.0 (SPSS Chicago, IL, USA). Fisher's exact test and the Chi-square test were used to compare categorical variables between the two groups. Continuous variables were compared by Student *t* test. Disease-free survival was calculated by the Kaplan–Meier method. A *p* value < 0.05 was considered statistically significant.

## 3. Results

The characteristics of the patients in the two groups, and of their tumors, are listed in Table 1. There was no difference in age, sex, duration of follow-up, tumor size, multifocality, ETE, lymphovascular invasion, perineural invasion, T and N classification, and stage between the two groups.

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