# Patients with papillary thyroid cancer who have central neck compartment (level VI) lymph-node metastases have a 70 to 100% chance of concurrent ipsilateral lateral compartment involvement

Machens A, Hauptmann S, Dralle H. Lymph node dissection in the lateral neck for completion in central node-positive papillary thyroid cancer. Surgery 2009;145:176-81.

## SUMMARY

**BACKGROUND** The rates of papillary thyroid cancer lymph-node metastases in both low- and high-risk patients range from 25% to 60%, depending on the extent of surgery. While mortality rates for papillary thyroid cancer are generally favorable, especially in younger patients, the locoregional recurrence rates are high and remain as a significant cause of morbidity and major concern of anxiety for patients. The locoregional spread of tumor cells is thought to flow through the lymphatic system in a sequential fashion beginning from the thyroid gland to the central neck compartment and subsequently to ipsilateral lateral compartments and to contralateral and mediastinal compartments. Residual lymph-node metastases that remain after initial therapy are the most common cause of subsequent recurrence. As a consequence, recent focus has been on the systematic dissection of the central lymph-node compartment, although ipsilateral lateral lymph node metastases often occur with similar frequency. This is a retrospective comparative analysis of central and lateral neck lymph-node metastases.

**METHODS** This is a retrospective study of 88 consecutive patients, all of whom had total thyroidectomy and central and lateral ipsilateral lymph-node dissections for previously untreated papillary thyroid cancer. In addition, 32 of the 88 patients (36%) had contralateral neck dissections. Mediastinal lymph-node metastases resected in 5 patients were not considered in this study. The 88 thyroid glands underwent a standardized examination in which the entire thyroid gland was divided vertically to separate the right and left lobes, and then sectioned horizontally from the superior to the inferior pole. Conventional staining (hematoxylin and eosin) and thyroglobulin immunohistochemical examination were performed on every surgical specimen. Two subgroups were analyzed, patients who had central and lateral ipsilateral dissections, and those who had bilateral lateral neck dissections.

**RESULTS** When stratified into two groups, one with only ipsilateral lateral lymph-node dissection and the other with bilateral lateral lymph-node dissection, all of whom had central compartment dissection, the two study groups were largely similar in terms of gender, age and tumor histopathology, including tumor size, multifocality, extrathyroidal growth and distant metastases (Figure 1), and the number of positive lymph-node metastases per neck compartment (Figure 2). The two groups were thus combined in one subsequent analysis.

For comparative analysis, the ipsilateral lateral and central lymph-node metastases were stratified into four groups: 0, 1-5, 6- 10, and more than 10 positive lymph-node metastases. The number of lymph nodes excised was significantly related to the number of metastases in the compartment (Figure 3). There was a significant association between the central lymph node categories and the number of lymph nodes removed from the central compartment, but not with the number of lymph nodes removed from the lateral neck. Ten of 22 patients (45%) who did not have central compartment lymph-node metastases had metastases in the ipsilateral side with the largest primary tumor, but no malignant lymph nodes were found in the contralateral lateral compartment (Figure 3). With each increasing category of central lymph-node metastases, there were significantly greater rates of lymph-node metastases (Figure 4). Among patients with only lateral lymph-node metastases, the successive increase in lateral lymph-node

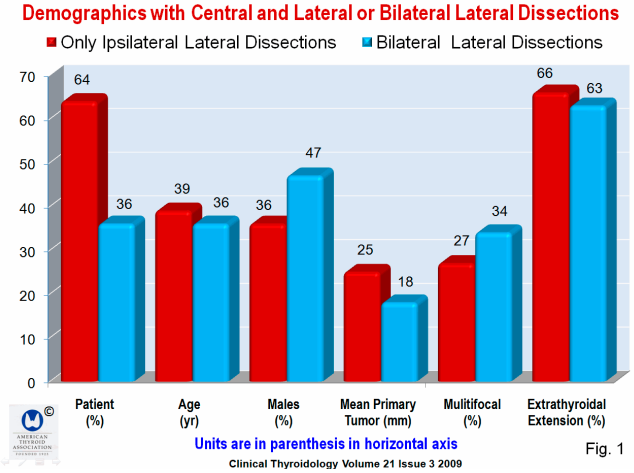


**Figure 1.** There were no significant differences in patient demographics and neck histopathology in the two subgroups that had central compartment, ipsilateral and bilateral lymph-node dissection.

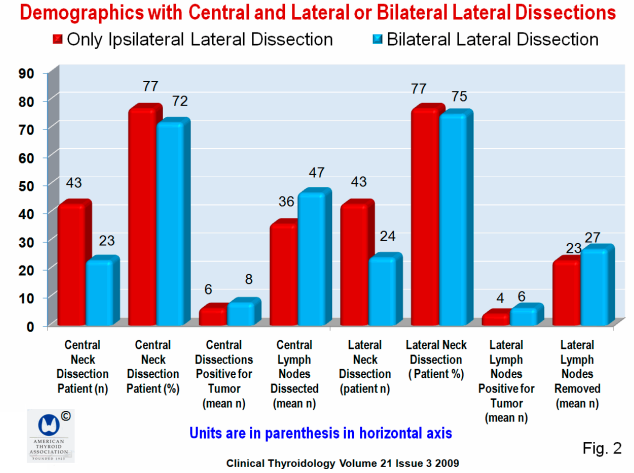


**Figure 2.** In patients with central compartment dissection and ipsilateral lateral or bilateral lateral neck dissection, there were no significant differences in the rates of neck compartment involvement and the number of positive and removed lymph node metastases per neck compartment. As a result, the two groups were thus treated as one study group.

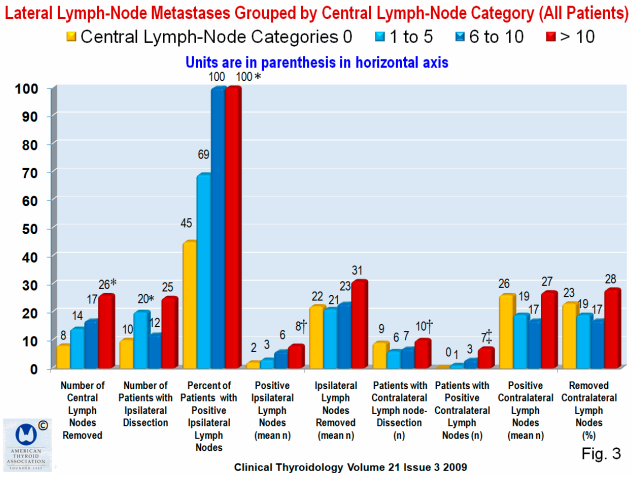


**Figure 3.** The number of lymph nodes excised was significantly related to the number of metastases in the neck compartment.*P<0.001, comparing the number of lymph node metastases by categories †P = 0.003, ‡P= 0.009 comparing lateral lymph node metastases with the data from all four central lymph-node categories.

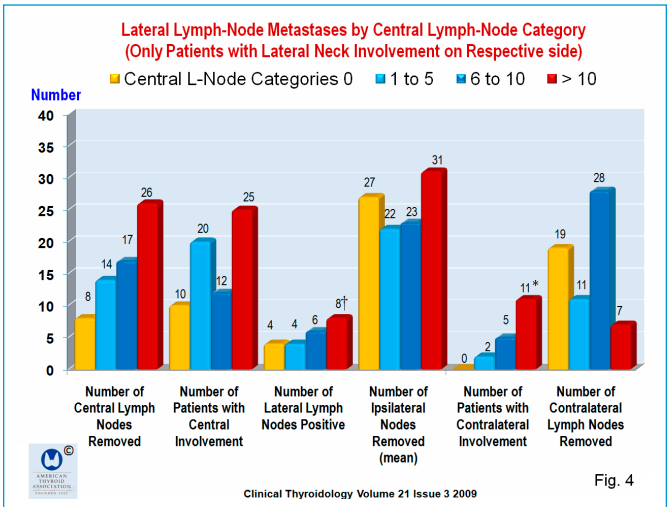


**Figure 4.** Among patients with only lateral lymph-node metastases, the successive increase in lateral lymph-node metastases was still present but was not influenced by the number of lateral lymph nodes removed. *P = 0.002, †P = 0.03, comparing lateral and contralateral lymph-node metastases with four central lymph-node categories.

metastases was still present but was not influenced by the number of lateral lymph nodes removed (Figure 4).

Figure 4. Among patients with only lateral lymph-node metastases, the successive increase in lateral lymph-node metastases was still present but was not influenced by the number of lateral lymph nodes removed. *P = 0.002, †P = 0.03, comparing lateral and contralateral lymph-node metastases with four central lymph-node categories.

**CONCLUSION** Patients with papillary thyroid cancer who have central neck compartment (level VI) lymph-node metastases have at least a 70% chance of ipsilateral lateral compartment involvement that should be considered for prophylactic dissection

## COMMENTARY

The study by Machens et al (1) retrospectively evaluates 88 patients who had undergone lateral neck dissection (ipsilateral or bilateral) and central neck dissection as initial therapy for papillary thyroid carcinoma at the time of thyroidectomy. The group studied represents a subset (35%) of 251 patients initially treated surgically for papillary cancer at their institution. The indications for lateral neck dissection in this group were not explicitly stated in the manuscript. The stated aim of the study was to quantitatively explore any relationship between the number of metastatic central neck nodes with the presence and number of metastatic lateral neck nodes.

The results of this study clearly show an increased likelihood of lateral lymph node metastasis with increasing numbers of positive central neck nodes (table II). This is consistent with a recent paper by Kwyak et al. (2). Others have found this to also be true for more advanced T stages (3). The more difficult question is whether prophylactic lateral neck dissection should be performed based upon these risk factors in the absence of clinical or imaging evidence of lateral nodal metastasis. In areas such as Japan and Korea where postoperative radioiodine is used infrequently, this approach is advocated (4).

The authors suggest in their discussion that bilateral lateral neck dissection should be considered for patients with > 5 metastatic central neck nodes due to the high rate of positive ipsilateral (100%) and contralateral (60-71%) nodal metastasis in the lateral neck. Further, the authors advocate consideration of ipsilateral lateral neck dissection for patients with between 1 and 5 metastatic central nodes based upon a high incidence of ipsilateral nodal metastasis (69%) in this study. The implication is that lateral neck dissection should be considered for completion of initial surgical management even if it requires a return to the operating room following prior thyroidectomy and central neck dissection based upon the final histopathological staging of the central compartment.

There is widespread agreement that all patients suspected of having papillary thyroid carcinoma should undergo neck imaging for detection of nodal metastasis using ultrasound and/or computed tomography (5). Ideally, this is performed prior to thyroidectomy based upon a cytological diagnosis or suspicion of malignancy such that appropriate therapeutic lateral neck dissection can be incorporated into initial surgical therapy (6). Unfortunately, our best imaging modalities are often unable to detect subclinical or microscopic nodal metastasis (7).

The presence of nodal metastasis has been shown to increase recurrence and mortality in well differentiated thyroid carcinoma (8). Comprehensive compartment oriented neck dissection results is lower rates of recurrence than node plucking or "berry picking" (9). The assumption behind prophylactic

neck dissection is those microscopic and macroscopic nodal metastases both have negative impacts on patient outcomes but a recent study by Bardet et al. (10) suggests that only macroscopic nodal disease impacts recurrence. Cranshaw et al. (11) reviewed the evidence and concluded that the presence of micrometastasis is of questionable significance, especially in regions where postoperative radioiodine use is common. In the United States, prophylactic lateral neck dissection is not routinely recommended (5).

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