Tumor Above the Spinal Accessory Nerve in Papillary Thyroid Cancer That Involves Lateral Neck Nodes

A Common Occurrence

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Objective: To describe the nature and extent of lateral neck node metastases from papillary thyroid cancer in relation to presenting physical examination and staging radiologic studies.

Design: Retrospective study.

Setting: Tertiary referral cancer center.

Patients: Consecutive patients who underwent comprehensive neck dissection with or without concurrent thyroidectomy for well-differentiated thyroid cancer between 1991 and 2001. Excluded were patients with well-differentiated thyroid cancer diagnosed incidentally at the time of treatment of other primary head and neck cancer, those with previous neck dissection for nonthyroid malignancies, and those undergoing surgery for medullary thyroid cancer.

Interventions: All pathology and operative and preoperative radiology reports for patients undergoing comprehensive neck dissection for well-differentiated thyroid malignancy were reviewed. Data were collected on previous procedures, preoperative evaluation, operative details, and pathologic findings.

Main Outcome Measure: Identification of metastatic thyroid cancer in one or more nodes in anatomically defined drainage basins of the central and lateral neck.

Results: A total of 51 neck dissections were performed. All patients had preoperative evidence of metastatic disease. In addition to the usual comprehensive node dissection encompassing all lymphatic tissue in levels II through V, level I nodes and level II nodes above the spinal accessory nerve were labeled as distinct regions in 16 (31%) and 34 (67%) specimens, respectively. Disease was confined to a single nodal level in 20 (39%) of 50 neck dissections. There was cancer at 2 or 3 levels in 16 (31%) and 15 (29%) cases, respectively. Seven (21%) of the 34 patients undergoing separate analysis of nodes from above the spinal accessory nerve had cancer there. In 3 of the 34 it was the sole disease in level II.

Conclusions: Tumor involvement at multiple nodal levels occurs in most cases when patients have lateral cervical node metastases. “Skip” metastases and cancer above the spinal accessory nerve are common. Neck dissections should include all node stations likely to be involved because selective node excision is likely to leave metastatic disease in situ.


The extent of surgery required for adequate removal of well-differentiated thyroid cancer has been debated. In the absence of evidence of metastatic disease, disagreement over the need for partial (lobe and isthmus) vs complete (total or near total) thyroidectomy has yet to be settled.1,2 Indeed, some researchers have even advocated prophylactic cervical lymphadenectomy for high-risk lesions.3,4 In a disease with an expected overall survival of greater than 90%, only large, impractical trials could answer such questions. Thus, retrospective reviews assume heightened importance.

The effect of small remaining tumor burden after thyroidectomy is not clear. Several studies have pointed to the frequency of subclinical nodal metastases in high-risk patients.9-11 Postoperative thyroid suppression with thyroid hormone replacement and the treatment of metastatic and residual disease with radioactive iodine have allowed successful nonoperative management of low-volume cervical disease.10,11 Several studies have pointed to the presence of lateral cervical nodal disease as an increased risk for local recurrence and/or decreased survival.1,3,13-15 To not expend radioactive iodine in the treatment of resectable palpable disease, we pursue an aggressive surgical approach to the management of clinically evident cervical metastasis from well-differentiated thyroid cancer.
Patients presenting with evidence of metastatic thyroid cancer underwent fine-needle aspiration of the suggestive mass if no previous tissue diagnosis had been obtained. In the presence of a concurrent thyroid cancer where malignancy was strongly suspected in palpable nodes, neck dissection was undertaken without proof of neck metastases. All patients underwent excision through an extended collar incision, with modifications made to encompass any previous thyroid or neck incisions. Incisions were carried laterally to the posterior border of the sternocleidomastoid and superiorly to the mastoid process. Scars from previous incisions were excised in their entirety. The thyroid bed was examined, and any residual thyroid tissue or recurrent tumor was removed. A comprehensive neck dissection was undertaken, including levels II through V in all cases. Level I was dissected as a separate specimen when clinically indicated. Level II nodal tissue above the spinal accessory nerve was regularly removed. Sometimes it was taken as a separate specimen. A central node dissection was undertaken in all patients without such a previous lymphadenectomy. Whenever possible, the internal jugular vein, sternocleidomastoid muscle, and the spinal accessory nerve were preserved.

We undertook a retrospective review of all neck dissections performed for well-differentiated thyroid cancer (with or without concurrent thyroidectomy) by 2 attending surgeons (J.A.R. and C.D.F.) at the Fox Chase Cancer Center, Philadelphia, Pa, between 1991 and 2001. Operations included unilateral and bilateral neck dissections (synchronous or staged) performed with or without total or completion thyroidecomies. Procedures for medullary and anaplastic thyroid were excluded from this analysis, as were procedures performed on patients with previous neck dissections for squamous cell cancers of the head and neck. An additional patient with an incidentally discovered papillary thyroid cancer in a single node of neck dissection for squamous cell cancer was excluded from this analysis.

Pathology reports from all procedures related to the diagnosis of thyroid cancer were reviewed for information related to primary tumor stage as well as the number and location of involved nodes. A node was considered positive if there was gross or microscopic evidence of thyroid cancer. Node location was classified by either the operating surgeon or the attending pathologist based on operative labeling. Patients undergoing operative procedures and biopsies of primary tumors and nodes at outside institutions had specimens reviewed at the Fox Chase Cancer Center.

Records were reviewed and data collected regarding patient age, sex, tissue diagnosis, date of initial diagnosis, previous operative procedures, and preoperative examination. Operative reports were reviewed and data collected regarding intraoperative labeling of nodal basins and the presence of additional extranodal disease, including residual or recurrent disease in the thyroid bed. Pathology reports were examined for tumor size, capsular invasion, presence of nonnodal metastases, number and location of all lymph nodes, and the number and location of tumor-bearing nodes.

The number of nodes containing metastatic disease was tabulated. The nodal level(s) were identified, and the number of nodes in a given level was noted for each patient. The overall number of nodes resected, the number of those containing metastatic disease, the number of nodal levels with disease, and the number of patients with disease at a specific level were recorded. Patients were assessed for the presence of uninvolved node levels between those with metastatic disease (“skip metastasis”). The number of patients was noted with metastases to level II above the spinal accessory nerve and in level I.

An accurate appraisal of residual disease is an important component of treatment planning. This report describes the extent of disease present in the lateral cervical nodes of patients presenting with clinically apparent nodal metastasis.

### METHODS

A total of 51 neck dissections were performed for well-differentiated thyroid cancer in 44 patients between 1991 and 2001. Unilateral neck dissection was performed in 37 patients (84%) and bilateral procedures in 7 (16%). Of those undergoing bilateral procedures, 3 patients had both sides operated on during a single procedure while the remaining 4 had staged procedures. For those undergoing staged procedures, the time between operations ranged from 7 to 55 days. A pathologic diagnosis of papillary cancer or one of its variants was present in all 44 patients. Three patients were excluded from this analysis: 1 with a previous neck dissection for laryngeal cancer, 1 with an incidentally discovered thyroid nodal metastasis at neck dissection for an oral cavity squamous cell cancer, and a third patient whose papillary cancer was found during prophylactic dissection for medullary carcinoma.

Assessment of primary tumor stage revealed T1 lesions in 11 patients (25%), T2 lesions in 9 (21%), and T4 tumors in 23 (52%). There was a single patient (2%) with a T3 lesion. The number of resected lymph nodes per specimen ranged from 15 to 79 (median, 40). All patients underwent comprehensive neck dissection, with 45 (88%) of 51 being type 3 dissections, preserving the spinal accessory nerve, internal jugular vein, and the sternocleidomastoid muscle. Types 1 and 2 neck dissections were performed in 4 and 2 patients, respectively.

Demographic information was gathered on all patients (n=44). Previous thyroid or lateral cervical surgery had been performed in 41 (93%) of 44 patients (Table 1). All 3 patients without previous procedures underwent fine-needle aspiration at our institution. Previous fine-needle aspiration was the sole procedure performed in 10 patients (23%), including 6 patients without previous thyroid cancer and 4 with a remote history of malignancy. Six patients (14%) had a history of thyroid cancer and had no

### RESULTS

#### Table 1. Previous Surgical Procedures*

<table>
<thead>
<tr>
<th>Previous Procedures</th>
<th>No. (%) of Patients</th>
</tr>
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<tbody>
<tr>
<td>Diagnostic only</td>
<td></td>
</tr>
<tr>
<td>FNA only</td>
<td>6 (14)</td>
</tr>
<tr>
<td>Previous surgery and FNA</td>
<td>4 (9)</td>
</tr>
<tr>
<td>Remote resection</td>
<td></td>
</tr>
<tr>
<td>Total or near-total thyroidectomy</td>
<td>6 (14)</td>
</tr>
<tr>
<td>Inadequate cancer surgery</td>
<td></td>
</tr>
<tr>
<td>Excisional biopsy of neck mass</td>
<td>16 (36)</td>
</tr>
<tr>
<td>Thyroidectomy and node picking</td>
<td>7 (16)</td>
</tr>
<tr>
<td>Previous neck dissection</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Incidental finding at unrelated surgery</td>
<td>1 (2)</td>
</tr>
<tr>
<td>None (FNA at FCCC)</td>
<td>3 (7)</td>
</tr>
</tbody>
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*FNA indicates fine-needle aspiration; FCCC, Fox Chase Cancer Center, Philadelphia, Pa.

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additional procedures performed in the face of clinical recurrence. Inadequate surgical therapy for clinically apparent metastatic disease had been attempted immediately prior to referral to our institution in 24 patients (55%), including excisional biopsy of a lateral neck mass (16 patients), “node picking” at the time of thyroidectomy (7 patients), and limited neck dissection (1 patient). A single additional patient was diagnosed when a node containing thyroid cancer was noted in a pathology specimen obtained during a procedure for thoracic outlet syndrome.

All lateral neck dissection specimens were analyzed separately (N=51) (Figure 1). At neck dissection, disease was confined to a single nodal level in 10 lateral node basins (20%) and was present in 4 or more levels in 7 (14%) of 51 specimens. Metastases were present at 2 levels in 16 (31%) and 3 levels in 15 (29%) specimens. Discontinuous nodal involvement (defined by the presence of a disease-free level between 2 tumor-bearing node regions) was observed in 7 (18%) of the 38 neck dissections containing metastatic disease at multiple levels (Figure 2). In addition to standard node dissection, level I nodes and level II nodes above the spinal accessory nerve were labeled as distinct regions in 16 (31%) and 34 (67%) specimens, respectively. In 6 (12%) of 51 node dissections, metastases were present in level I. In all instances, nodal disease was present in other areas of the neck. Seven (21%) of the 34 specimens obtained from above the spinal accessory nerve had cancer. In 3 of the 34 it was the sole disease in level II.

For patients presenting after an excisional biopsy as their only surgical intervention in the neck (n=16), additional nodal disease was found in 13 patients (81%). The number of additional positive nodes ranged from 3 to 24 (mean, 9 nodes) in these 13 patients. Two of the 3 patients without lateral node metastases had paratracheal nodal metastases at surgery. In this group of 16 patients, 7 (44%) had no evidence of additional disease by preoperative physical or radiologic examination, and 1 patient (6%) had disease detected by magnetic resonance imaging only. Eight patients (50%) had additional disease evident on physical examination. A primary thyroid lesion was evident in 9 (56%) of the 16 patients preoperatively, and cancer was found in all 16 pathologic specimens. Six of the primary tumors were 5 mm or less in diameter.

After complete pathologic examination, 8 node specimens (16% of neck dissections) had no evidence of nodal metastases in the lateral neck dissection specimen (Table 2). Three of these patients had undergone a previous excisional biopsy as their only surgical intervention and thus had neck dissections performed with a thyroidectomy. In 2 of the 3 patients, extrathyroid disease was found in central or paratracheal nodes. A fourth patient who had undergone previous node picking at the time of thyroidectomy was found to have disease only in the central compartment on reexplanation. The remaining 4 patients had extrathyroid disease but none in lateral cervical nodes (including 2 patients undergoing bilateral neck dissections, with nodal disease on one side and an isolated paratracheal node on the other).

Intermediate-term follow-up was available on a sizeable portion of this patient population.16 Among 38 patients, there was a disease-related mortality of 11%, universally associated with the presence of systemic disease. Lateral neck control was achieved in 35 (80%) of 44 necks dissected.

Cervical metastases of papillary thyroid cancer are common. Factors having an effect on survival include age, sex, stage, tumor size and grade, and the extent of disease (including the presence of cervical metastases).1-3,32,17,18 Rates of cervical metastases ranging from 11% to 80% (influenced by the nature and timing of neck dissection) have been reported. The prevalence of cervical metastases is highest when prophylactic neck dissections are performed and lower when selective dissections are performed. In the latter situation, the presence of cervical metastases clearly correlates with decreased local control and survival.1 This has not proven true for microscopic disease found at prophylactic dissection. Although several studies have suggested increased disease-free and overall survival in patients with more extensive thyroid surgery, no series has examined the...
have termed these level without disease was present in 7 of 38 patients. We additionally, while 75% of patients in this study had nodal metastasis in patients with or without a previous diagnosis of thyroid cancer signified the presence of additional extrathyroidal disease in 43 (98%) of 44 patients in this series. Additionally, metastases were present at multiple nodal levels in the overwhelming majority of patients with lateral cervical metastases. Cancer in nodes above the spinal accessory nerve is common, as are skip metastases. We recommend comprehensive neck dissection for patients with lateral cervical metastases to address all stations likely to be involved. Selective node excision is not likely to extirpate all disease.

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REFERENCES


