Elective Management of the Clinically Negative Neck by Otolaryngologists in Patients With Oral Tongue Cancer

John W. Werning, MD, DMD; Diana Heard, MD; Cassandra Pagano, BA; Sadik Khuder, PhD

Background: The treatment of patients with squamous cell carcinoma of the head and neck who have a clinically negative (cN0) neck remains controversial. Furthermore, the treatment delivered to patients with a cN0 neck by practicing otolaryngologists is not known.

Objective: To determine the variability in the management of the cN0 neck in the otolaryngology community.


Main Outcome Measures: Physician respondents' preferences for observation vs treatment of the cN0 neck and the treatment modalities chosen.

Results: Forty-one percent of the surveyed physicians responded. Nearly 10% of the respondents observed all patients with a cN0 neck. Otolaryngologists who treat 35 or more new patients with cancer each year were more likely to perform elective treatment of the neck for a T2 lesion of the oral tongue than those who treat 10 or fewer patients each year (P = .03). They were also more likely to treat patients with a cN0 neck when the risk of occult cervical metastases was greater than 15% to 20% (P = .04). A comprehensive neck dissection was the preferred lymphadenectomy procedure for 21% of the otolaryngologists surveyed.

Conclusions: Variations in the treatment of the cN0 neck are associated with differences in the frequency of treatment of patients with head and neck cancer by otolaryngologists. Uniformity of care must be established within the otolaryngology community by developing widely accepted evidence-based guidelines and referring patients to surgeons who routinely treat head and neck cancer.


MANAGEMENT of the clinically negative (cN0) neck in patients with head and neck cancer continues to challenge head and neck surgeons. Historically, treatment ranged from elective radical neck dissection (RND) or elective irradiation of the neck to a watchful waiting policy, observing for the subsequent development of nodal metastatic disease. Advocates of a watchful waiting policy cite the morbidity associated with elective surgery and irradiation, whereas proponents of elective treatment believe it prevents the subsequent development of clinically evident regional metastatic disease, provides pathologic information for staging purposes, and may improve survival.

A physical examination and radiographic modalities, such as computed tomography, are unable to identify every neck with occult nodal metastasis (ONM). In one study, serial sectioning of lymph nodes from cN0 necks revealed that 37% of the necks contained nodal metastatic disease and that micrometastases of less than 3 mm were exclusively found in 25% of these elective neck dissection specimens. Therefore, physicians who electively treat the cN0 neck must use clinical judgment to select those patients who they believe are at a significant risk for ONM, weighing the risks of treatment-related morbidity.

Decision analysis has been used to evaluate clinical studies of patients with cN0 necks, and researchers have concluded that treatment of the cN0 neck is warranted if the probability of occult metastasis is greater than 20%. Many institutions perform elective treatment of the cN0 neck when the risk of ONM exceeds 15% to 20%. However, the actual management of the cN0 neck by practicing otolaryngologists remains unknown. In the present study, we surveyed a nationwide random sample of board-certified practic-
METHODS

A random sample of 763 board-certified otolaryngologists were selected from the 2001 AAO-HNS Membership Directory. The survey was forwarded to each physician by facsimile. Physicians were randomly selected from all 50 states and the District of Columbia. Physicians who did not respond within 1 month were faxed a second copy of the survey. All physicians were surveyed using the same instrument, which contained the following clinical scenario:

A 55-year-old male cigarette smoker presents for evaluation of a painful tongue lesion. On examination, the lesion is 3 x 2 cm in size and located on the right lateral oral tongue. The lesion does not extend into the floor of the mouth and does not involve the mandible. On palpation, the lesion extends approximately 1 cm deep into the body of the tongue. A biopsy demonstrates invasive squamous cell carcinoma. No other lesions were identified following comprehensive examination of the head and neck. The patient is edentulous. Clinical examination, as well as CT [computed tomographic] scan, demonstrates no evidence of cervical adenopathy. Chest radiography is negative. His past medical history is otherwise noncontributory.

The survey instrument contained items pertaining to the previously described scenario regarding the surveyed physician's preferences for treatment of the primary lesion and the neck, including type of neck dissection and lymph node levels removed if the physician chose to perform a selective neck dissection. The survey also contained items that addressed the respondent's general treatment philosophy for the cN0 neck and demographic information about the surveyed physician, including age, number of years in practice, and approximate number of new patients who were diagnosed as having cancer and/or treated by the physician in a 12-month period.

Statistical analysis for the data was performed using χ² analysis and the Mantel-Haenszel test for categorical variables and nonparametric tests for continuous variables. All analyses were performed using SAS statistical software (SAS Institute Inc, Cary, NC).

RESULTS

Of 763 otolaryngologists surveyed, 313 returned the survey, for an overall response rate of 41%. Fifty-two physicians were excluded from the analysis because of retirement (n=8) or because they did not actively care for patients with head and neck cancer (n=44). The remaining 261 respondents were included in the analysis. The geographic distribution of the 261 respondents' practice sites was evaluated according to the geographic regions defined by the US Bureau of the Census. The greatest number of respondents practiced in the South (36%). The Midwest represented the second most common practice location of the respondents (23%), followed by the West (22%) and the Northeast (18%) (percentages do not total 100 because of rounding). The mean age of the respondents was 47.6 years (range, 32-73 years), and the median number of years in practice was 16. The median number of patients with cancer cared for by the respondents yearly was 20 (range, 1-400). Twenty-three percent of the respondents treat 10 or fewer patients per year, and 19% treat more than 50 patients per year. When the otolaryngologists who practiced for more than 15 years were compared with those who practiced for 15 years or fewer, both groups cared for a median of 20 patients with cancer per year.

Surgery was the most common treatment modality chosen to manage the T2 primary oral tongue lesion described in the survey scenario. Seventy-three percent of the respondents chose surgery as the modality of choice, followed by surgery plus postoperative radiotherapy (25%), radiation therapy (1%), and concomitant chemotherapy plus radiotherapy (1%).

The cN0 neck in the patient scenario presented was treated with elective neck dissection by 66% of the physicians. Nineteen percent of the physicians chose to treat the neck with radiotherapy, and 13% preferred to observe the patient for the subsequent development of nodal metastasis. Surgery followed by radiotherapy and other recommendations for treatment were each chosen by 1% of the respondents.

Of the respondents, 208 reported the elective neck dissection they would perform for the patient in the survey scenario: 79% would perform a selective neck dissection, 19% preferred a modified RND, and 2% would perform an RND. (However, only 174 physicians would perform an elective neck dissection as the procedure of choice: 171 chose surgery and 3 chose surgery plus radiotherapy.) The lymph node levels removed by the 164 otolaryngologists who would perform a selective neck dissection were as follows (percentages do not total 100 because of rounding):

<table>
<thead>
<tr>
<th>Lymph Node Level</th>
<th>No. (%) of Otolaryngologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>55 (34.1)</td>
</tr>
<tr>
<td>1-2</td>
<td>8 (5.2)</td>
</tr>
<tr>
<td>1-3</td>
<td>91 (55.5)</td>
</tr>
<tr>
<td>1-4</td>
<td>56 (34.1)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (2.4)</td>
</tr>
</tbody>
</table>

As noted, approximately 56% preferred to perform a supraomohyoid neck dissection (SOHND), and approximately 34% would remove lymph node levels 1 through 4, performing an extended SOHND.

Table 1 summarizes the relationship between the number of patients cared for per year and management of the cN0 neck in this patient with T2 oral tongue cancer. As the number of patients with cancer treated by otolaryngologists decreases, the tendency to observe the neck increases (P=.04, Mantel-Haenszel test). Furthermore, physicians who care for 35 or more patients with cancer per year were more likely to treat the neck than those who care for 10 or fewer patients per year (P=.03, χ² test).

Table 2 illustrates the relationship between the number of years in practice and management of the cN0 neck in this patient. Otolaryngologists who were in practice for more than 15 years were less likely to treat the cN0 neck than physicians practicing for 15 years or fewer (P=.005).

The following question was used to determine the responding physicians' usual treatment approach to the cN0 neck: “When do you treat patients with a cN0 neck?” The responding physicians that treat the cN0 neck were asked to provide the treatment threshold they use, based on the risk of ONM, in 5% increments (eg, treat when...
Oral tongue cancer is the most common cancer in the oral cavity. A recent report extracted from the National Cancer Data Base demonstrated that 31.9% of all oral cavity malignancies originate in the oral tongue. The patient discussed in the survey presented with a 3-cm oral tongue lesion that demonstrated 1-cm depth of invasion by palpation, clinically a T2 N0 lesion. From a review of the literature, the risk of occult metastases for this lesion ranges from 30.6% to 77.0% (Table 5).

Although the presence of cervical lymph node metastasis is associated with increased mortality, the impact of ONM on survival has been less certain. Hiratsuka et al recently demonstrated a 5-year cancer-specific survival of 94% for patients with pathologically negative necks compared with 51% for patients with ONM (P < .001). Extracapsular spread is also a frequent finding in cN0 necks of patients with head and neck cancer. In a prospective evaluation of 96 elective neck dissection specimens, Coatesworth and MacLennan demonstrated extracapsular spread in 70% of the pathologically positive cases were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).

Table 3 summarizes the relationship between number of patients treated per year and management of the cN0 neck. If a treatment threshold of greater than 15% to 20% risk of ONM is compared with all other treatment choices, the tendency to use a greater than 15% to 20% treatment threshold increased as the number of patients treated by the physician increased (P = .03). Furthermore, physicians who treated 35 or more patients per year were more likely to use a greater than 15% to 20% treatment threshold than physicians treating 10 or fewer patients per year (P = .04).

The relationship between management of the cN0 neck and the number of years in practice is summarized in Table 4. Physicians in practice for more than 15 years were more likely to choose observation (P = .001) and were also more likely to select any management option other than the greater than 15% to 20% treatment threshold (observe or treat when the risk of ONM is less than 5% or greater than 25%) when compared with physicians who had practiced for 15 years or fewer (P = .001).
specimens. The impact of microscopic extracapsular spread on survival, however, has not been established by a study with an adequate sample size.

Thirteen percent of the respondents chose to observe the patient with oral tongue cancer that was described in the clinical scenario, even though the risk of developing clinically evident regional metastasis exceeded 30%. Furthermore, 10% of the responding physicians reported that they routinely observe all patients with a cNO neck regardless of tumor stage or the site of the primary lesion. The survey did not attempt to address the rationale for these treatment preferences. However, those who have advocated a policy of watchful waiting cite the paucity of data to support improved survival following elective treatment of the neck. Three prospective randomized trials have compared watchful waiting with elective neck dissection for the cNO neck in patients with oral cavity cancer. Kligerman et al demonstrated improved survival when elective neck dissection was performed, whereas Vandenbrouck et al failed to show improved survival. The third prospective randomized trial, which evaluated elective RND vs observation in patients with T1 or T2 lesions of the oral tongue, was unable to demonstrate a survival benefit when elective RND was performed. Two retrospective reviews from the 1990s also demonstrated mixed results regarding the survival advantage of those undergoing elective neck dissection. Other researchers have found that when clinicians observe the neck, patients tend to experience regional failure with advanced disease in the neck, and 50% of them are not candidates for salvage treatment. However, some clinicians continue to advocate watchful waiting. Additional prospective trials are necessary to clarify the survival benefit of treating the neck vs the inherent risks involved in therapeutic intervention.

Elective neck dissection was preferred by 66% of the otolaryngologists. Seventy-nine percent of the respondents chose to perform a selective neck dissection, while 21% would perform a comprehensive neck dissection. Only 2% chose to perform an RND. Important research by Byers and colleagues convincingly demonstrated that squamous cell carcinoma in the cNO neck metastasizes to the cervical lymph nodes in a predictable and sequentially progressive pattern. Elective neck dissection specimens of patients with oral cavity cancer predominantly metastasized to lymph node levels 1 through 3. In a review of 58 patients with oral tongue cancer and a cNO neck who underwent an elective RND, only 3% of the necks contained metastases at level 4 and no metastases were identified at level 5. Byers and colleagues similarly found no metastases at level 4 or 5 in 48 neck dissection specimens obtained from patients with oral tongue cancer who had a cNO neck. Most of the neck dissections in this study, however, were selective neck dissections, preventing examination of all the lymph node levels at risk. These investigations established the foundation for the development of modifications of the RND, such as the SOHND, to reduce the morbidity of neck dissection. Byers and colleagues have subsequently demonstrated a 15.8% frequency of “skip metastases” to levels 3 and 4 in patients with oral tongue cancer, suggesting the need to perform an extended SOHND in these patients. Fifty-six percent of the physicians choosing surgery in our survey perform an SOHND and 34% perform an extended SOHND.

Limited research exists to support the oncologic efficacy of selective neck dissection. A single prospective randomized trial showed no difference in survival between patients who underwent elective SOHND and those who underwent elective modified RND for oral cancer. In the absence of conclusive survival data, some clinicians advocate the performance of elective neck dissection for pathologic staging purposes and for determining the need for postoperative radiotherapy. The value of using SOHND for staging purposes, however, has been questioned by others, who believe that incomplete removal of all lymph node levels results in an overreliance on other therapeutic treatments, such as postoperative radiotherapy.

A dichotomy clearly exists in treatment philosophy for the cNO neck among board-certified otolaryngologists. Although most physicians prefer to treat the cNO neck with either surgery or irradiation, watchful waiting remains a treatment option for a significant portion of the otolaryngologists who actively care for patients with head and neck cancer. Moreover, our analysis suggests that certain factors, such as length of time in practice and frequency of patient care, may be predictive of a physician’s adherence to a particular treatment philosophy. The reasons for these trends are unclear, but some investigators have concluded that a physician’s specialty training, formal and informal, plays a key role in his or her treatment decisions. For example, influential research from The University of Texas M. D. Anderson Cancer Center, Houston, and Memorial Sloan-Kettering Cancer Center, New York, NY, may have resulted in a shift in the management philosophy for patients with suspected ONM. In 1980, researchers from The University of Texas M. D. Anderson Cancer Center wrote that elective RND in the cNO neck was not justified, whereas in 1993, they advocated elective neck dissection in all patients with T1 oral tongue cancer. Similarly, surgeons at Memorial Sloan-Kettering Cancer Center observed the
cN0 neck in patients with oral tongue cancer until 1978, but subsequently advocated more aggressive treatment of the cN0 neck. The changing treatment philosophy for the cN0 neck at these 2 cancer centers may have resulted in differences in resident training at other institutions, resulting in more aggressive treatment of the cN0 neck by more recent graduates of otolaryngology training programs.

This study focused on the treatment preferences of otolaryngologists for the cN0 neck in patients with oral tongue cancer and may not be reflective of treatment preferences for cancers arising from other sites, such as the oropharynx and larynx. However, our research underscores the need to gain greater insight into the actual practice patterns of otolaryngologists and the impact of disparate management schemata on outcomes in patients with head and neck cancer.

Several studies have demonstrated differences in the management of common illnesses, such as congestive heart failure, hypertension, and chronic obstructive pulmonary disease, by physicians with different training backgrounds. Variations in treatment philosophy for other forms of cancer have also been evaluated. Fowler et al compared the management recommendations of urologists with those of radiation oncologists for the treatment of clinically localized prostate cancer. Seventy-two percent of radiation oncologists believed that radiation therapy was as effective as radical prostatectomy, while 93% of urologists preferred radical prostatectomy. However, no study, to our knowledge, has shown a dichotomy in the treatment approach for a particular illness within the same specialty.

Although our research demonstrated a relationship between the number of patients treated and management of the cN0 neck, the importance of this difference remains unclear because incontrovertible survival data do not exist to advocate elective treatment of the neck. We are unaware of any research that demonstrates improved quality of care based on the frequency of disease-specific patient treatment by individual physicians. Several investigators have evaluated the impact of hospital volume on surgical mortality. In a recent review of 14 selected cardiovascular and cancer procedures, mortality decreased as surgical volume increased for each procedure, suggesting that patients can significantly reduce their risk of operative death by selecting a high-volume hospital. Further research is necessary, however, to evaluate the impact of a physician’s clinical experience with a particular disease entity on clinical decision making and patient outcomes.

In conclusion, there is a lack of consensus within the otolaryngology community regarding management of the cN0 neck. Otolaryngologists who routinely treat patients with head and neck cancer tend to demonstrate a lower treatment threshold for the cN0 neck. More recent graduates of residency training also tend to manage the cN0 neck in a more aggressive manner. Additional randomized prospective trials are necessary to determine whether elective treatment of the cN0 neck improves survival in patients with head and neck cancer, and evidence-based guidelines must be developed to standardize management within the otolaryngology community.

Accepted for publication September 25, 2002.

This study was presented at the annual meeting of the American Head and Neck Society, Boca Raton, Fla, May 11, 2002.

We thank Peggy Wellman for her assistance with the preparation of the manuscript.

Corresponding author and reprints: John W. Werning, MD, DMD, Department of Otolaryngology, University of Florida, 1600 SW Archer Rd, Room M-228, Gainesville, FL 32610-0264 (e-mail: wernljw@ent.ufl.edu).

REFERENCES


**Correction**

Error in Byline and Affiliations. In the Original Article titled “Exclusively Endoscopic Removal of Juvenile Nasopharyngeal Angiofibroma: Trends and Limits,” published in the August issue of the ARCHIVES (2002;128:928-935), the third author’s last name was spelled incorrectly in the byline and affiliations on page 928. The correct spelling is “Froehlich.”