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Grand Rounds Archives

CLASSIFICATION OF NECK DISSECTION

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December 2, 1993

The management of cervical metastasis associated with malignant neoplasms of the upper aerodigestive tract remains controversial. Since Crile first proposed the radical neck dissection to manage malignant cervical adenopathy in 1906, reporting of the development of conservation procedures aimed at reducing morbidity and maintaining function in cancer patients has grown in the literature. In 1991 the Committee for Head and Neck Surgery and Oncology of the Academy of Otolaryngology Head and Neck Surgery proposed guidelines for standardization of neck dissection terminology in an attempt to eliminate the confusion surrounding the plethora of terms applied to the various modifications of the classical radical neck dissection. This abstract will review the primary lymphatic drainage pathways in the head and neck and will review the classification of neck dissection currently used for reporting results and for the standardization of patient care.

Lymph nodes are grouped according to levels in the neck. Level I includes nodes from the submental and submandibular triangles. Level II represents the upper jugular group extending from the skull base to the carotid bifurcation; level III (the middle jugular group) extending from the carotid bifurcation to the omohyoid muscle; and level IV located below the omohyoid and above the clavicle (lower jugular group). Level V includes all of the lymphatics in the posterior triangle from the skull base to the clavicles and form the anterior border of the trapezius to the posterior border of the sternocleidomastoid muscles. Level VI represents the nodal groups between the medial borders of the carotid sheaths bilaterally and from the hyoid bone superiorly to the suprasternal notch inferiorly.

Shah reviewed 1119 radical neck dissection specimens done at the Memorial Sloan Kettering Hospital between 1965 and 1986. The oral cavity most commonly involved nodal levels I, II, and III, with level IV (20%) and level V (4%) affected less often. Most oropharyngeal primaries metastasized to levels II, III, and IV with level I involvement in 17% and level V disease present in 11% of cases. The hypopharyngeal structures involved levels II, III, and IV in the majority of cases, while levels I and V were positive for metastasis in 10% and 11% respectively. Primaries of the larynx metastasized to levels II, III, and IV most commonly, and to level I in 8% and level V in 5% of cases. Further evaluation of drainage pathways can be reviewed by referring to Lindberg's 1972 paper.

Clinical evaluation of neck metastasis begins with thorough palpation of all nodal levels. Variations in examiner experience yields false negative results of 20% to 30% and false positive rates of 20%. Computed tomography (CT) is an adequate adjunct to physical examination and is most useful in assessing paratracheal and retropharyngeal nodes which are inaccessible to manual examination. Magnetic resonance imaging is currently under investigation and offers little more than CT scanning. Ultrasound is most useful to localize nodes for fine-needle aspiration (FNA). FNA is quite useful in the head and neck due to its sensitivity for epithelial malignancies.

Manual palpation of the neck under anesthesia during direct laryngoscopic assessment of primary tumor sites is combined with clinical examinations to arrive at neck staging. Nx means regional lymph nodes cannot be assessed. No neck adenopathy is staged N0 while N1 refers to a single ipsilateral node less than 3 cm in greatest dimension. N2 staging is broken down into N2a (single ipsilateral node between 3 and 6 cm), N2b (multiple ipsilateral nodes less than 6 cm), and N2c (bilateral or contralateral nodes none greater than 6 cm). N3 refers to metastasis in a lymph node greater than 6 cm in greatest dimension.

Modifications of neck dissection are based on the classical radical neck dissection operation. Modified radical neck

dissection refers to removal of neck lymphatics with conservation of one or more nonlymphatic structures (spinal accessory nerve, internal jugular vein, and sternocleidomastoid muscle). These operations should be described as "modified radical neck dissection with preservation of ..." as opposed to type I, II, or III as proposed by Medina. Selective neck dissection refers to preservation of lymph node groups commonly uninvolved in metastatic spread from the specific primary tumor site. These include the supraomohyoid, posterolateral, lateral, and anterior compartment neck dissections.

Elective neck dissection using conservation procedures is well accepted in most centers, with radiotherapy being used as adjunctive treatment in cases where lymph nodes positive for malignancy are found in more than one level and when extracapsular spread of tumor in lymph nodes is noted on permanent pathology. Much controversy exists, however, in the management of the N1 neck. Conservative dictum mandates radical neck dissection in all cases while those favoring vital structure sparing and functionally conservative procedures argue that the modified neck dissections detract little, if any, from the oncologic soundness of neck dissection.

In conclusion, neck dissection terminology has now been standardized to maximize patient care and the reporting of therapeutic results. Treatment plans must be individualized for each patient based on the primary tumor and predicted levels of lymph node metastasis. More importantly, in order to improve long term survival more must be elucidated concerning the biology of commonly occurring tumors in the head and neck and mechanisms of distant metastasis.

Case Presentation

A 73-year-old white man with a 50 pack/year smoking history and continued moderate alcohol use presented to the VAMC's Otolaryngology Clinic with a 6-month history of progressive hoarseness, new onset dysphagia, a 20 pound weight loss, chronic cough, and dyspnea. He had been seen previously by his private physician. CT scanning from that visit delineated a large right piriform sinus lesion with invasion of the thyroid cartilage. On physical examination in our clinic, he was noted to have a right piriform sinus mass with right vocal cord fixation. Bruits were detected in both carotid arteries. Fine needle aspiration of a 2 centimeter right level II neck mass revealed metastatic squamous cell carcinoma. Carotid doppler studies were remarkable for critical stenosis of the right internal carotid with significant left carotid disease. Carotid arteriograms demonstrated total right internal carotid occlusion and 20 percent stenosis of the left ICA. Direct laryngoscopy, esophagoscopy, and nasopharyngoscopy were notable for a mass fungating from the right piriform sinus involving the post-cricoid area with suspicion of disease at the rim of the epiglottic inlet. The tumor did not cross the midline posteriorly. The subglottic space, nasopharyngeal area, and esophagus were without disease. No additional cervical adenopathy was detected. Tracheotomy was performed due to airway compromise by the mass. He was staged as a T4 N1 M0 squamous cell carcinoma of the piriform sinus. The patient underwent total laryngopharyngectomy and right modified radical neck dissection with preservation of cranial nerve XI, the internal jugular vein, facial artery, and transverse cervical vessels. Reconstruction was completed utilizing a free jejunal microvascular transfer. He is currently recovering and doing well postoperatively.