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HEAD AND NECK CANCER SYMPOSIUM

SWING OF THE SURGICAL PENDULUM: A RETURN TO SURGERY FOR TREATMENT OF HEAD AND NECK CANCER IN THE 21st CENTURY?

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Treatment for head and neck cancer has evolved significantly during the past 100 years. Beginning with Bilroth's total laryngectomy on New Year's Day in 1873, "radical" surgery remained the only accepted treatment for head and neck cancer when optimal local and regional control was the goal. Bigger was still better when it came to managing the primary tumor and the neck. The "commando" procedure and radical neck dissection were the hallmarks of this first generation of treatments of head-and-neck cancer. With the advent of microvascular reconstructive techniques, larger and more comprehensive resections could be performed. Despite these large resections and their "mutilating" sequelae, overall survival did not improve. Even for intermediate-stage disease in head-and-neck cancer, the 5-year survival rate did not improve >50%. Many concluded that more than the scalpel was needed for optimal local and regional control, especially for intermediate- and advanced-stage disease. Most important, the multidisciplinary teams must identify and correlate biomarkers in the tumor and host that predict for a response to therapy and for optimal functional recovery. As the pendulum swings back, a scientific approach using tissue biomarkers for the response to treatment in the setting of multidisciplinary trials must emerge as the new paradigm. In the postgenomic era, treatment decisions should be made based on functional and oncologic parameters—not just to avoid perceived morbidity. © 2007 Elsevier Inc.

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Treatment for head and neck cancer has evolved significantly during the past 100 years. Beginning with Bilroth's total laryngectomy on New Year's Day in 1873, ''radical'' surgery remained the only accepted treatment for head-and-neck cancer when optimal local and regional control was the goal. Bigger was still better when it came to managing the primary tumor and the neck. The ''commando'' procedure and radical neck dissection were the hallmarks of this first generation of treatments of head-and-neck cancer. With the advent of microvascular reconstructive techniques, larger and more comprehensive resections could be performed. Despite these large resections and their ''mutilating'' sequelae, overall survival did not improve. Even for intermediate-stage disease in head-and-neck cancer, the 5-year survival rate did not improve >50%. Many concluded that more than the scalpel was needed for optimal local and regional control, especially for intermediate- and advanced-stage disease.

At the same time, in the 1970s and 1980s, the importance of radiotherapy (RT) gained wider acceptance—first as an adjunct treatment after surgery. More effective cytotoxic chemotherapy was introduced in the early 1980s and was used in the neoadjuvant setting with RT for organ preservation in patients with advanced cancer of the larynx. In 1991, a Department of Veterans Affairs Laryngeal Cancer Study demonstrated equivalence in overall survival between patients treated with total laryngectomy followed by postoperative RT compared with patients treated with induction chemotherapy and primary RT (1). Since this landmark study, primary nonoperative methods have assumed a greater role in the treatment of patients with head-and-neck cancer.

With the advent of improvements in RT, such as intensity-modulated RT and the advent of concurrent chemotherapy with RT, more treatment options are available to patients. In 2003, with the publication of the Radiation Therapy Oncology Group 91-11 study (2), the standard treatment for intermediate- to advanced-stage laryngeal cancer became concurrent chemotherapy with RT (cRT). By then, the paradigm had changed, and the cRT approach was routinely used for all subsites within the head and neck.

However, this cRT ''organ-preservation'' approach can be associated with extensive morbidity and significant functional impairment. Although certain patients perform remarkably well, with both excellent oncologic results and limited functional compromise, inexplicably, others do much worse. After

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cRT, an important minority of patients have a preserved anatomic organ, but significant functional compromise, necessitating tracheotomy and/or gastrostomy. Worse still, for those patients treated with cRT who later require salvage total laryngectomy, the postoperative complications are increased and survival is significantly diminished (3).

Despite the risks inherent in treatment selection, no criteria are available to predict for favorable outcomes, oncologic or functional. With little knowledge of the underlying biology of the head-and-neck squamous cell carcinoma and virtually no understanding about which patients respond to this cRT approach, we forge on with this nonoperative paradigm.

Many believe that these functional outcomes of an organ-preservation approach are nudging the pendulum in a different direction. Are we beginning to move away from a primary nonoperative approach? Is the pendulum in treatment selection swinging back toward surgery?

Fortunately, surgical alternatives are now available for functional organ preservation, because ''conservation surgery'' of the head and neck has enjoyed a quiet renaissance during the past two decades. Transoral laser microsurgery and supracricoid partial laryngectomy have been established as viable approaches to treat laryngeal carcinoma. Both European and American schools have developed in the practice of transoral laser microsurgery. ''Radical'' or ''mutilating'' ablative procedures are no longer the only surgical options.

Supracricoid partial laryngectomy was first described in 1959 by two Austrian surgeons, Majer and Rieder, working in Vienna (4). The technique was published in French and quickly drew the attention of the French school. This new operation demonstrated that the impaction of the hyoid bone on the cricoid cartilage could permit restoration of physiologic speech and swallowing function. During the next two decades, French surgeons proposed important technical modifications, including Labayle and Laccourreye working in Paris and Piquet working in Lille (5). After these changes, the technique became widely adopted in France. In the early 1980s, Laccourreye organized these disparate procedures as the supracricoid partial laryngectomy and standardized the reconstruction as either cricohyoidopexy or cricohyoidoepiglottopexy (5). In 1990, both surgical techniques of supracricoid partial laryngectomy-cricohyoidoepiglottopexy and supracricoid partial laryngectomy-cricohyoidopexy were introduced into the English literature by Laccourreye *et al*. (6, 7). For intermediate-stage disease, two large reviews from France have confirmed the efficacy of this approach. At the Laennec Hospital in Paris, the 5-year actuarial local control estimates for Stage T3 squamous cell carcinoma of the endolarynx was 91.4%, with an overall 89.8% laryngeal preservation rate and 98.3% local control rate (8).

Transoral laser microsurgery represents another important option for functional preservation. Transoral laser microsurgery is minimally invasive and performed under suspension direct laryngoscopy, with an operating microscope, microsurgical instruments, and the surgical carbon dioxide laser. The carbon dioxide laser is used because water absorbs this frequency of light (10,600 nm), minimizing collateral damage to nearby structures.

Strong and Jako (9) first introduced the carbon dioxide laser to the head-and-neck surgeon in 1972, when they declared that the transoral laser microsurgery was ''ready for clinical trial.'' Steiner and others have successfully adapted the fundamental aspects of open procedures to the endoscope with excellent results. (10)

However, the use of the line-of-sight carbon dioxide laser has been limited by the difficult exposure, especially in the laryngopharynx, owing to anatomic limitations such as a short or stiff neck, retrognathia, obesity, or cervical spine immobility. A new fiberoptic carbon dioxide laser, using photonic bandgap technology (11), is now available. The flexible fiber system could improve the surgeon's ability to contour the resection by wielding the laser, for the first time, as a scalpel. The fiber might a more intuitive transition from the open surgical approach to broadening endoscopic minimal access resection for patients with head-and-neck cancer. Hockstein *et al*. (12) have demonstrated the safety, feasibility, and precision of transoral robotic surgery. The application of the fiberoptic carbon dioxide laser with the transoral robotic surgery is just around the corner. Thus, many new surgical options are available—not just mutilating and disfiguring procedures.

As the pendulum swings back toward the center, away from surgical radicalism on the one hand and nonoperative reliance on toxic concurrent chemoradiotherapy on the other, we must establish risk-based criteria for treatment selection and functional outcome—rather than celebrating a single modality of treatment over any other, whether surgery, radiotherapy, or chemotherapy.

Most important, the multidisciplinary teams must identify and correlate biomarkers in both the tumor and host that predict for response to therapy and for optimal functional recovery. As the pendulum swings back, a scientific approach using tissue biomarkers to determine to the response to treatment in the setting of multidisciplinary trials must emerge as the new paradigm. In the postgenomic era, treatment decisions should be made according too the functional and oncologic parameters—not just to avoid morbidity.

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