Conservation Surgery for Laryngeal Cancer

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It has been said that “modern day laryngeal cancer surgery is built upon the work of a long succession of predecessors.” In 1869, Solis-Cohen did the first successful laryngectomy in the United States. In 1873, Theodor Bilroth performed the first successful total laryngectomy with the patient surviving for a year after surgery, until tumor recurrence eventually caused his death. Gluck, in 1880, performed laryngectomy using a two-staged technique consisting of tracheal separation and pharyngeal repair. In 1886, the first successful trans-oral treatment of early vocal fold cancer was done by Fraenkel. Killian then introduced suspension laryngoscopy in 1912.

During these early times, the survival rate after laryngectomy was 50% or less -- mainly attributed to unsanitary surgical conditions. Mortality rate in the 1900’s then decreased to 13% through the development of aseptic techniques and further refinement of the laryngectomy procedure. Particularly, laryngeal conservation surgery was introduced. Supraglottic surgery and hemilaryngectomy were among the first refined laryngeal conservation surgery techniques introduced by Justo Alonzo in 1946 and Ogura in 1955, respectively. Supracricoid laryngectomy was introduced by Major and Reider in Vienna in 1959. Picquet gave more details of SCPL with CHEP/ CHP in 1986, and different pioneers including Laccourreye and Brasnu further exposed the technique to the world in 1990. Conservation procedures for laryngeal cancer became more widely used until CO2 laser resection was eventually introduced in 1966 by Jako and Kleinsasser. The use of CO2 laser and SCPL reached their peak in the 1970’s. Furthermore, treatment for laryngeal cancer had been more holistic with the role of radiotherapy having been investigated upon from the early 1990’s through many larynx preservation trials (e.g., EORTC, RTOG, GORTEC, EORTC).

In our local experience, in the Philippine General Hospital alone, a total of 79 total laryngectomy cases, 13 supracricoid laryngectomy cases, and 1 hemilaryngectomy case were performed from 2005 to 2009. In a study done at a private tertiary hospital, 35 cases of stage III and IV laryngeal squamous cell carcinoma from 2002 to 2006 were investigated and the 5-year survival rate was 66.67%.

Throughout history, and with first hand local experience, it has been demonstrated that the management for laryngeal cancer may either be surgical or non-surgical. Surgical options can be subdivided into total laryngectomy, conservation surgeries, and endoscopic (e.g., CO2 laser) surgeries. Non-surgical options include radiotherapy and/or chemotherapy. Laser surgery may be advocated for all T1 and most T2a carcinomas of the glottis regardless of the pattern of tumor spread in an experienced laser surgeon. In the use of the laser for laryngeal cancer, it is of no significance whether the tumor is unilateral or bilateral or whether it extends to involve the supraglottis or subglottis. In cases of more extended carcinomas (e.g., T2b, T3) it may be necessary to perform laser excision in portions. The incision follows the extensions of the tumor and is made deeply into the muscles until a tissue layer is encountered, which shows the reaction of normal tissue to the laser dissection under the microscope. Laser surgery was found to have a 5-year local control rate of 100% for T1 lesions and 89% for T2 lesions. The ultimate survival rate for 400 cases of T1 to T2 glottic SCCAs was
found to be 99%, with 26 reported recurrences and 10 cases requiring total laryngectomy. The survival rate with the use of CO2 laser for advanced laryngeal and hypopharyngeal SCCA was found to be decreased from 47 to 75%. In a local study by Lim, the 3-year survival rate of 36 cases of T1 to T2 laryngeal SCCA was reported to be 100%.

Another option for earlier stages of laryngeal carcinoma are conservation surgeries which include laryngofissure with cordectomy, fronto-vertical laryngectomy, anterior frontal laryngectomy, hemilaryngectomy, supraglottic laryngectomy, and supracricoid partial laryngectomy.

Hemilaryngectomy is indicated for lesions with unilateral involvement of the vocal fold, non-involvement of the thyroid cartilage, non-involvement of the epiglottis and cricoid cartilage, and T1-T2 glottic CA. Contraindications for hemilaryngectomy include involvement of the thyroid cartilage, bilateral involvement of the vocal folds, gross involvement of the epiglottis, or cricoid cartilage. Several studies have shown the 2-year and 5-year survival rates of T1 and T2 lesions managed with hemilaryngectomy to range from 84 to 98%. The most recent study of 10 hemilaryngectomy cases for T2 lesions reported a 2-year survival rate of 83%.

Supracricoid partial laryngectomy is indicated for lesions showing bilateral involvement of the vocal fold, minimal involvement of the anterior commissure, impaired mobility of the cords, T3 glottic lesions with minimal subglottic extension, and T4 tumors with limited thyroid cartilage invasion. Contraindications for supracricoid partial laryngectomy include pre-operative evidence of severe pulmonary impairment, involvement of the cricoid cartilage, involvement of the hyoid bone, significant pre epiglottic space involvement, fixation of both arytenoid cartilages, and invasion of the outer perichondrium of the thyroid cartilage. In a study by Lefebvre and Chevalier in 2002 reported an ultimate local control of 98% for 41 supracricoid partial laryngectomy cases of T3 and T4 laryngeal SCCA, with 5% local recurrence rate, and 95% larynx function preservation. Several studies have reported decannulation rates after supracricoid laryngectomy-CHEP to range from 93 to 100% with an average decannulation time ranging from 9 days to 56 days. A more recent local study by Pontejos and Eslava, with an average decannulation time of 20 days. The duration of nasogastric tube ranged from 10 to 45 days for 12 patients. Complications of supracricoid partial laryngectomy include transient respiratory distress secondary to pneumonitis, bleeding, pharyngocutaneous fistula, neck abscess, thrombophlebitis, stenosis, aspiration, chronic cough, and pulmonary embolism. In a systemic review by Drinnan et al. in 2011, it has been concluded that open conservation laryngectomy is a good option in selected primary laryngeal cancers with excellent oncologic outcomes.

Indeed, we have come a long way from the time of Prof. Bilroth and Solis-Cohen. Advances in surgical treatment of laryngeal cancer have further improved the quality of life of patients by preserving voice, in a good number of cases, without compromising survival.

References


