Using stapes surgery, the air-bone gap can be closed to <20 dB in patients with a large sensorineural hearing loss.

**Background:** Most practitioner’s wait until hearing loss reaches a certain threshold before they will do stapes surgery. One common criterion is to wait until the Rinne test demonstrates a reversal of air and bone conduction thresholds. At the opposite end of the spectrum, there are otosclerosis patients who have severe hearing loss. One school of thought is that, in these patients with a very large hearing loss, the otosclerosis has advanced into the cochlea making stapes surgery less effective. Is this really the case?

**Objective:** To determine if the outcome of stapes surgery is affected by preoperative hearing level.

**Design:** Retrospective review.

**Participants:** 141 patients operated on for otosclerosis between 1998 and 2008.

**Methods:** Audiograms were performed preoperatively and at least 3 months postoperatively. Patients were stratified into 3 groups based on the status of their preoperative air conductive hearing: group 1, 40 to 54 dB; group 2, 55 to 69 dB; and group 3, 70 to 89 dB. Stapes surgery was then performed.

**Results:** There was a significant age difference between groups, with older patients tending to fall into the worse hearing groups. Preoperative bone conduction thresholds also tended to be worse in patients with worse air-conduction thresholds, indicating that sensorineural hearing loss was a significant factor, although the air-bone gap also grew significantly larger in worse hearing groups. After surgery, all groups experienced an improvement in both air-conduction and bone-conduction hearing. Air-conduction hearing improved by 25 dB in the group with the best preoperative hearing and by 35 dB in the group with the worst preoperative hearing. All groups also demonstrated a small improvement in bone conduction, which ranged from 7 to 13 dB. A small improvement in speech discrimination scores was also observed in all patient groups. In all groups, the air-bone gap was closed to <20 dB. Although a worsening of bone-conduction hearing levels was observed in a few patients, this was not correlated with severity of hearing loss.

**Conclusions:** This study demonstrates that the success of stapes surgery does not depend on the degree of preoperative hearing loss.

**Reviewer’s Comments:** It is not clear that the worst hearing group had worse otosclerosis as opposed to just presbycusis superimposed on otosclerosis. Stapes surgery has now been performed in various forms for >50 years, and it has been shown to be safe and effective in a number of studies, several of which have been prospective and included >1000 patients. This study is not a revolutionary one, but it does drive home the point that we should still offer stapes surgery to patients who have a significant preoperative sensorineural component to their hearing loss.

Additional Keywords: None

Print Tag: Refer to original journal article
Background: Second implants have been shown to improve speech understanding in noise as well as sound localization. However, for most patients who received their first implant several years ago, it may not be possible to use the same technology for the second implant. How should we counsel these patients?

Objective: To evaluate speech perception in patients with a second cochlear implant using different technology.

Design: Retrospective review.

Participants: 20 adults who underwent a bilateral cochlear implant at New York University using a different technology from the original implant. These patients were compared with 8 patients who underwent simultaneous bilateral implantation using the same technology, and 3 who had bilateral sequential implantation with the same technology.

Methods: All patients had full electrode insertion, and there were no surgical complications. All 3 major cochlear implant manufacturers were represented, using a variety of devices and speech processors from each. Patients underwent preoperative and 1-year postoperative testing. The main outcome measure was the consonant nucleus consonant (CNC) word test.

Results: All groups were found to be improved after the second cochlear implant. This improvement was manifest in both individual ears as well as binaural hearing. All patients did better in the binaural condition than for either ear alone, and all were regularly wearing both speech processors. For patients with different technology in the second implant, the binaural CNC score was 73%, versus 53% with either ear alone.

Conclusions: This study found that having different technologies in each ear is not a factor in speech perception outcomes. In fact, CNC scores were higher in the group of patients who had different technologies than in the cohort of patients who had similar implants in both ears. In 3 patients, there was no significant change in binaural scores between preoperative and postoperative evaluations. Interestingly, these patients were also among those with the greatest time between their first and second implant. The study also found that it was not necessary to match speech-processing strategies in the first and second implant, even though some manufacturers allow this to be done.

Reviewer's Comments: The literature on second implants in adults has been somewhat controversial. Although patients generally do better after second implants, a 2005 study by Ramsden and colleagues demonstrated that long delays between implantations can have a detrimental effect on outcome. However, a more recent study demonstrated some benefit from a second implant even if there is a long delay. This study indicates that the worse income with longer delays between implantations is probably not due to a difference in technology. We should counsel patients seeking a second implant to have realistic expectations; however, it is likely that most will be benefited.

Additional Keywords: None

Print Tag: Refer to original journal article
Hearing Preservation With Radiation Is Poor for Certain Patients

Predictors of Hearing Preservation After Stereotactic Radiosurgery for Acoustic Neuroma.
Kano H, Kondziolka D, et al.:
J Neurosurg 2009; March 13 (epub ahead of print):

Patients who have the best rate of hearing preservation are young patients with near-normal hearing who receive low doses of radiation to their cochlea.

Background: The rate of hearing preservation after radiation for acoustic neuromas is a controversial issue.

Objective: To examine factors that may lead to worse hearing outcomes.

Design: Retrospective review.

Participants: 77 patients with acoustic neuromas who underwent gamma knife radiation between 2004 and 2007. Mean age was 52 years, and speech discrimination was 92%.

Methods: Patients were excluded for unserviceable preoperative hearing. Patients were also excluded if they had a follow-up of <6 months. Radiation therapy was delivered using the gamma knife.

Results: 39% of patients had a reduction in their Gardner-Robertson hearing score post-radiation; 29% deteriorated to unserviceable hearing. Mean time for hearing loss onset was 25 ± 5 months. Those with worse hearing before radiosurgery tended to have the largest declines in hearing afterward. More than 90% of patients with a pre-radiation speech discrimination score <80% experienced significant hearing loss. Older age was associated with worse hearing preservation. Of patients aged <60 years, 70% maintained their same hearing level 2 years after radiation, but only 18% of those aged >60 years were able to maintain their hearing. The dose of radiation delivered at the modiolus of the cochlea was a prognostic factor. Individuals who received <4.2 Gy lost hearing in only 13% of individuals, but for those who received >4.2 Gy, there was hearing loss in 41%.

Conclusions: According to these data, the best chance for hearing preservation after radiation is for patients aged <60 years who have near-normal hearing and who receive low doses of radiation to the cochlea.

Reviewer's Comments: One major criticism is that the majority of patients were followed for <2 years. Mean time for dropping to a lower Gardner-Robertson score was 25 months, which is longer than most patients were followed. We might conclude from this that the hearing preservation results would be much worse if all patients were followed during this longer interval. The radiation dose to the cochlea data is difficult to interpret. Patients given larger doses likely had larger tumors, or worse hearing. It is impossible to know from these data since the radiation dose to the cochlea is not an independent variable. It is not surprising that patients who do best after radiosurgery are young patients with near-normal hearing. These are also patients who do best with surgery. If these patients have small tumors that are not growing, they often do not require treatment. Because long-term effects of radiation are unknown, many practitioners are less likely to recommend radiation in this age group. What I take away from this study is that, for patients aged >60 years and those with a speech recognition score <80%, the chance of maintaining serviceable hearing 2 years after radiation is very small.

Additional Keywords: None

Print Tag: Refer to original journal article
BAHA Devices Improve Quality of Life in Children

Quality of Life in Children Fitted With a Bone-Anchored Hearing Aid.


Children with all indications for placement of a bone-anchored hearing aid report an improved quality of life.

**Background:** Bone-anchored hearing aids (BAHAs) are now commonly used to treat single-sided deafness and conductive hearing loss. There are several advantages over traditional hearing aids. The BAHA can be a good option for children, especially those with large conductive hearing losses due to external auditory canal atresia. However, in pediatric patients, there are other issues that should be considered: (1) Children are less likely than adults to keep the implant clean. (2) The bone is thinner, which, combined with physical activities of children, makes it more common that the implant can become displaced. (3) The BAHA will be visible in children with short hair and may provoke taunting by peers. (4) In children who are considering aural reconstructions, its important to ensure that placement of the device does not interfere with future surgery.

**Objective:** To determine how the BAHA affects quality of life in children.

**Participants:** 115 patients aged 2 to 15 years who received a BAHA; 8 had bilateral devices. All children had worn the device for at least 6 months.

**Methods:** Patients were sent the Glasgow Children's Benefit Inventory, which is a survey designed to evaluate pediatric otolaryngologic surgery. The authors scaled the scores so that the final score was between +100 (maximal benefit) and -100 (maximal harm).

**Results:** Of 115 patients selected, 84 questionnaires were returned. The overall benefit score for pediatric BAHA wearers was +54. When responders were stratified by condition (aural atresia, chronic suppurative otitis media, Down syndrome, Goldenhar syndrome, Treacher Collins syndrome), there was a positive similar benefit in all conditions. Patients were also allowed to write free-form comments. Although most of these were positive, the most disappointing issue involved sound processor failures. General health issues such as time off, visits to the physician, and medications were essentially unaffected by BAHA. However, behavior, concentration, and learning development showed improvement after BAHA placement. One major concern some parents have about BAHA is whether it will cause taunting by other children, which turned out not to be a major issue. Only 13% said self-consciousness and embarrassment were worsened after BAHA. Of children, 97% were currently wearing their BAHA on a daily basis.

**Conclusions:** Quality of life was improved in children after BAHA.

**Reviewer's Comments:** In the United Kingdom, there is a tradition of health insurance paying for hearing aids, but hearing aids have not generally been covered for patients in the United States. For this reason, I believe the BAHA procedure has been more commonly performed in England. Here, it has historically also been difficult to convince insurers to pay for the BAHA device. Although recent progress has been made on this front, I am routinely asked to justify BAHA use to insurance companies before they will approve surgery. It is important for providers to be familiar with the literature such as this paper and others that have demonstrated a clear benefit to the BAHA device.

Additional Keywords: None

Print Tag: Refer to original journal article
Enhanced multimodal tinnitus retraining therapy has been shown to be an effective method to treat patients with chronic tinnitus.

**Background:** Despite the high prevalence of tinnitus, the actual cause of tinnitus cannot be clearly identified in most patients. There are likely multiple mechanisms and contributing factors, which include hearing loss, noise exposure, stress, depression, and insomnia. Because of the complexity of this symptom, multiple therapies have been described, with some focused on the tinnitus itself and others focused on control of contributing factors.

**Objective:** To assess the value of a multimodal tinnitus retraining therapy in a controlled study.

**Design:** Part retrospective review and part randomized controlled study.

**Participants:** 237 patients with a history of tinnitus who were treated at the authors' institution between 2004 and 2007; 90 were randomly assigned to either therapy or a waiting list.

**Methods:** Treatment consisted of a 7-day multimodal outpatient program. Patients were analyzed prior to therapy, after 7 days, as well as 6 months and 1 year later. Symptoms were assessed using the Tinnitus Questionnaire (TQ), Perceived Stress Questionnaire (PSQ), and general depression scale (ADS).

**Interventions:** The first day of treatment involved progressive muscle relaxation and stress management. During the subsequent 6 days, patients received counseling, daily acoustic therapy, physiotherapy, and individual psychological consultations, including treatment for anxiety and depression when indicated.

**Results:** The control group did not exhibit any significant change in TQ, PSQ, or ADS after 3 months. The treatment group revealed highly significant decreases in TQ and ADS at 3 months, while the decrease in PSQ was of borderline significance. Average TQ at the start of the study was 34, which was decreased by 11 at 1 year. The TQ decrease was independent of symptom severity. However, when the PSQ and ADS scores were stratified, results indicated that patients with higher stress and depression levels had better responses to therapy. The therapy was similarly effective in both male and female patients as well as older and younger patient groups.

**Reviewer's Comments:** These results are similar to those reported by others, even though the method and duration of therapy have been extremely variable between centers. The current report of an intensive 7-day therapy has results that compare well with studies of treatments spread out over several months. If a shorter duration of therapy is equally effective, would it have advantages of lower cost and better patient compliance? The advantage of this study is that it includes a control group, which demonstrates that passage of time alone does not have a significant effect. It also stratifies patients into different groups to see if therapy is more effective in some groups than in others. Studies of this type are difficult because it is hard to define an appropriate control group. An interesting comparison would be to use psychological and support group treatment for anxiety and depression alone as a control.

Additional Keywords: None

Print Tag: Refer to original journal article
During head and neck cancer surgery, there are relatively straightforward ways to limit intraoperative hypothermia, such as covering the patient as much as possible, covering the flap donor site until needed, increasing room temperature, and warming IV fluids.

**Objective:** To determine whether intraoperative hypothermia is associated with an increased risk of perioperative complications in patients undergoing head and neck surgery with regional or free flap reconstruction.

**Design:** Retrospective chart review.

**Participants:** 136 patients who underwent resection for head and neck cancer along with concomitant free or regional flap reconstruction.

**Methods:** The primary end point was whether operative hypothermia led to complications. Hypothermia was defined as a core body temperature <35°C, and complications were recorded within a 3-week period. Other preoperative variables were studied as well. All patients had active air warmers placed on nonoperative sites, while IV fluids were at room temperature.

**Results:** Of 136 patients in the study, 43 had complications, including partial or complete flap loss (n=10), hematoma (n=9), pneumonia (n=8), fistula and wound infection (n=7 each), wound breakdown (n=5), and other complications (n=8). There was no significant difference between the no-complication group and complication group, with respect to age, length of surgery, time of hypothermia, and mean core body temperature. Furthermore, there was no difference between groups with respect to chemotherapy, stage IV disease, gender, tobacco use, and requirement of blood products during surgery. However, presence of hypothermia at any point during surgery was correlated with perioperative complications ($P < 0.002$), with an odds ratio of 5.1 (range, 1.32 to 19.92).

**Conclusions:** Operative hypothermia is independently associated with increased perioperative complications, and precautions should be undertaken to prevent hypothermia in these extended cases.

**Reviewer's Comments:** There have been many studies looking at hypothermia and how this might affect patients in the operating room. Of course, vasoconstriction will ensue, thus compromising blood flow to the flaps, but there may also be other detrimental effects, such as decreased cellular immunity or coagulopathy. There are relatively straightforward ways to limit hypothermia, such as covering the patient as much as possible, covering the flap donor site until it is needed, increasing room temperature, and warming IV fluids. As this study suggests, I think it is important to consider, not only for the patient's comfort, but also for a smoother postoperative course.
Chemoselection Proves to Be Good Indicator of Response

Chemoselection as a Strategy for Organ Preservation in Patients With T4 Laryngeal Squamous Cell Carcinoma With Cartilage Invasion.

Worden FP, Moyer J, et al:
Laryngoscope 2009; 119 (August): 1510-1517

Chemoselection by measuring response after 1 cycle of induction chemotherapy may help select which patients will respond favorably to primary chemoradiation.

Objective: To determine whether specific chemoradiotherapy protocols are useful in the treatment of patients with T4 laryngeal cancer.

Design: Retrospective review.

Participants: 36 patients with T4 larynx cancer with cartilage invasion and/or extralaryngeal spread who were undergoing induction chemotherapy followed by combined chemoradiotherapy.

Methods: Patients underwent induction chemotherapy with cisplatin and 5-fluorouracil. Those who achieved >50% response then went on with primary chemoradiation, while those with <50% response underwent total laryngectomy and postoperative radiation.

Results: Of 36 patients, 20 had extralaryngeal invasion, while 16 had cartilage invasion alone. After induction chemotherapy was given, 29 patients (81%) had a >50% response at the primary site, and 27 went on to receive chemoradiation. Of 7 patients who did not have a marked response, 6 received laryngectomy, and 1 was a poor surgical candidate and was treated with radiation alone. Of 27 patients who received chemoradiation, 23 were complete responders, while 4 had incomplete response and went on to laryngectomy. Of 23 responders, 2 later relapsed and required salvage laryngectomy. The 3-year laryngectomy-free and disease-free survival was 58%. Of 36 patients, 6 (17%) required tracheostomy at >12 months, and 6 (17%) required gastrostomy tubes at >12 months.

Conclusions: Patients with T4 laryngeal cancers were previously thought to fare poorly with primary chemoradiation. Using 1 cycle of induction chemotherapy as a selector of response, these patients who respond favorably are potential candidates for organ-preserving primary chemoradiotherapy.

Reviewer's Comments: It has become a bit of dogma that patients with larynx cancers exhibiting cartilage invasion fare poorly to chemoradiation, either due to bulk of disease or to increased aggressiveness of tumors. Thus, we have been trained that these patients should opt for surgical options, generally total laryngectomy. While this study uses induction chemotherapy to help stratify which patients are more likely to respond to primary chemoradiotherapy, the numbers are small. In addition, there are data coming forth suggesting that our national survival data for treatment of larynx cancers are declining, perhaps in part due to a decreased use of surgery. So while intriguing, much more data should be accrued in a multicenter fashion before we can confidently implement such a protocol.

Additional Keywords: None

Print Tag: Refer to original journal article
Addressing the neck in patients with T3-4 larynx cancer is warranted, and selective neck dissection (levels II to IV) is an adequate dissection for optimal control of disease.

**Objective:** To determine the need and efficacy of selective neck dissection (SND) in patients with T3-4 larynx cancer and clinically negative necks.

**Design:** Retrospective chart review.

**Participants:** 327 patients with T3-4 N0 (based on clinical exam and CT techniques) squamous cell cancer of the larynx who underwent primary surgical therapy and 654 neck dissections.

**Methods:** Data were collected from charts, and primary end points were rates of regional recurrence (RR), survival, and predictors of distant metastasis.

**Results:** 183 patients had transglottic tumors (56.0%), while 74 (22.6%) had supraglottic tumors and 70 (21.4%) had glottic tumors. Total laryngectomy was performed in 221 (67.6%), while 57 (17.4%) had supracricoid laryngectomy and 49 (15%) had near-total laryngectomy. There were 247 cT3 patients and 80 cT4 patients. After pathologic review, 110 of 247 cT3 patients (44.5%) were upstaged to pT4, while 27 of 80 (33.7%) cT4 patients were downstaged to pT3. Of 654 heminecks operated on, 603 (92.2%) were SNDs, while 51 (7.8%) were modified radical neck dissections (MRND). Seventy patients (21.4%) had positive microscopic disease in the neck, with 31 staged as pN1, 24 as pN2b, and 15 as pN2c. Twenty-four patients (7.3%) developed RR; 4 patients had pN+ disease, while 20 occurred in patients who were pN-. Most patients had RR within levels II to IV, while recurrence in level I occurred in only 1 patient, and level V was involved in 2. Of 603 heminecks treated with SND, 18 (3.0%) developed RR, while 6 of 51 (11.7%) heminecks treated with MRND developed RR. Extracapsular extension was predictive of RR in the pN+ group, while in the pN0 group, microvascular invasion of the primary and the type of neck dissection were significant. Five-year regional control rates were comparable in the SND and MRND groups at 96.8% and 95.3%, respectively. On multivariate analysis, histologic grade, nodal positivity, and extracapsular extension were predictors of distant metastasis.

**Conclusions:** Addressing the neck in patients with T3-4 larynx cancer is warranted, and SND (levels II to IV) is an adequate dissection for optimal control of disease.

**Reviewer's Comments:** Several studies have espoused use of SND in the setting of N0 disease for patients with larynx cancer. This is one of the larger studies performed, so the conclusions are more powerful. Less useful are their survival data, which are colored by the fact that the addition of radiotherapy was somewhat different than what we might consider standard now. Nonetheless, there are useful data suggesting that the neck should be addressed, and that levels II to IV are the most likely to be involved.
Objective: To determine the incidence of human papillomavirus (HPV) in early larynx cancers.

Design: Retrospective analysis.

Participants: 62 patients with T1 or carcinoma in situ (Cis) larynx cancer were initially identified for testing, but 15 cases did not have sufficient tissue, and 9 did not have sufficient polymerase chain reaction (PCR) amplification.

Methods: 38 cases of T1 or Cis laryngeal lesions were screened by a PCR-based assay for presence of consensus sequences of HPV. The HPV subtype was then determined by reverse line blotting, which hybridizes these probes to detect up to 37 different HPV subtypes.

Results: 6 patients (16%) were positive for HPV presence; of these, the subtypes were HPV-16 (n=2) and 1 each of HPV-26, HPV-31, HPV-39, and HPV-52. Four of these 6 patients were not smokers ($P =0.07$), and they tended to be younger (51.0 years vs 62.5 years; $P =0.007$). Due to a small sample size, there was not a statistically significant analysis of their recurrence rate, but the rate did appear to be lower in the HPV+ group (1 of 6) compared to the HPV- group (14 of 29).

Conclusions: HPV may be present in a higher degree of patients with early laryngeal cancer than previously thought.

Reviewer's Comments: The association of HPV and oropharynx cancer has been a well-described phenomenon, and it does appear that these patients fare better in large randomized trials. Several studies have postulated that HPV might thus be present in oral cancer, or larynx cancer, with variable results. One of the hurdles is the method of detection, as PCR-based techniques are prone to contamination and may be overly sensitive in detecting HPV, and that the mere presence of HPV does not necessarily imply its involvement in cancer formation. I thought this study was intriguing but very far from telling the whole story; the subtypes identified are less well known, and whether they are just transient bystanders is not well defined. A larger, more robust cohort is needed, with better molecular analysis and clinical follow-up data, before one can claim that HPV vaccination will reduce the incidence of laryngeal cancer.

Additional Keywords: None

Print Tag: Refer to original journal article
Patients are more at risk for laryngeal complications of intubation than nerve injury during thyroid surgery.

**Objective:** To measure laryngeal complications after thyroid surgery.

**Participants:** 761 patients undergoing thyroid surgery in a University medical center.

**Methods:** All patients completed preoperative and postoperative videostroboscopic evaluation. Postoperative examination was completed 3 to 4 days after surgery. Laryngeal complications were defined as newly discovered findings that were not present at the time of preoperative evaluation. Age, sex, histopathologic diagnosis, and surgical procedure were analyzed.

**Results:** 18.0% of patients had preoperative laryngeal findings, and 1.8% had pre-existing recurrent laryngeal nerve (RLN) palsy. Of patients, 42.0% had new laryngeal findings after surgery, with 31.3% being attributed to direct vocal fold injury and 11.0% being attributed to RLN palsy. Patients with preoperative findings were no more likely to have postoperative changes than were those without preoperative findings. Neither pathologic status nor type of dissection had an impact on the rate of RLN palsy; however, revision surgery was found to increase the risk of RLN damage.

**Conclusions:** Patients are more likely to experience damage to the vocal folds from intubation than RLN damage during thyroid surgery.

**Reviewer's Comments:** This important study demonstrates through serial stroboscopy that patients may be at fairly high risk for laryngeal complications after thyroid surgery, although the risks appear to be due more to intubation than to RLN damage. It is important, however, to consider the temporal aspect of different complications and their relative impact on patient outcomes and satisfaction. As the authors discuss, a previous report by Pröschel and Eysholdt demonstrated an even higher rate of complications (73%) when patients were evaluated 1 to 2 days after surgery. In contrast, studies with longer follow-up times demonstrated complication rates as low as 6.2%. It is probable that, due to the transient nature of many intubation injuries such as edema and mucosal thickening, these complications often go undetected in clinical practice. Although, from an academic perspective, it is important to acknowledge their presence and prevalence; of greater importance is consideration of vocal complications that may lead to actual dysfunction and/or patient handicap. Because these patients were not followed in a more long-term manner, we do not understand well whether these early complications had a long-term impact on patients. It would be interesting to consider the Voice Handicap Index (VHI) scores of such patients in both a short- and long-term setting to determine the relative impact of intubation injuries after return to the home environment. de Pedro Netto and colleagues in 2006 attempted to answer this question by comparing videostroboscopy and VHI scores of patients undergoing thyroid surgery with those undergoing breast surgery, and found higher rates of vocal dysfunction and voice handicap in the thyroid group. This suggests that, although intubation injury needs to be considered, it may not be the factor most responsible for actual vocal handicap.

**Additional Keywords:** None

**Print Tag:** Refer to original journal article
Concurrent radiation and chemotherapy is a reasonable treatment alternative for patients with advanced-stage laryngeal cancer with vocal cord fixation.

**Background:** Squamous cell carcinoma of the larynx with vocal cord fixation is associated with infiltration of deep muscle and cartilage. These are considered advanced stage lesions, often resulting in poor functional outcome following chemoradiation therapy. Current management options for such cancers include primary surgery followed by radiation or concurrent chemoradiation and radiation.

**Objective:** To evaluate nonsurgical management of T3/T4 laryngeal carcinoma and implications of pretreatment and posttreatment vocal cord immobility.

**Design/Methods:** Retrospective chart review of 23 patients with T3/T4 squamous cell carcinoma of the larynx with vocal cord fixation at presentation who were treated between 1989 and 2005 at a single tertiary care hospital. All patients were treated with a concomitant cisplatin-based chemoradiotherapy protocol. Median follow-up was 68 months. Following treatment, 12 patients recovered full range of mobility, 3 had partial recovery, and 8 did not recover any vocal cord motion. Outcomes were compared between patients who recovered partial or full mobility and those with persistent fixation. Five-year overall survival was 100% for patients who recovered function compared to 25% for those who did not. Likewise, 5-year freedom from recurrence was 86.7% and 25.0%, respectively. Local control without surgery was 86.7% versus 30.0%, and survival with functional larynx was 86.7% versus 25.0%, respectively. Four of 8 patients (50%) who did not recover function underwent a total laryngectomy for local or primary site recurrence. Two of 15 (13.3%) patients with preserved function experienced functional failure of larynx preservation, defined as persistent tracheostomy, feeding tube dependence, or laryngectomy. In comparison, functional failure was observed in 6 of 8 (75%) patients with posttreatment vocal cord fixation.

**Conclusions/Reviewer’s Comments:** Several studies have shown that organ preservation treatment protocols for advanced-stage laryngeal carcinoma, involving a combination of chemotherapy and radiation, result in comparable outcomes to primary surgery with or without postoperative radiation therapy. This study again establishes concurrent radiation and chemotherapy as a reasonable treatment alternative for patients with advanced-stage laryngeal cancer. More than half of patients treated with this protocol recovered a functional larynx, which is substantial. Nonetheless, for those patients who had persistent vocal cord fixation after treatment, prognosis was very poor. This is a concern, as these patients possibly would have had substantial improvement in locoregional control and overall survival with primary surgical treatment, or with early surgical intervention following chemoradiation failure. The authors therefore suggest that patients who do not recover function should be closely followed, and that salvage surgery should be considered early. This treatment formula may achieve maximal laryngeal preservation, while at the same time achieving respectable rates of locoregional control and survival.

Additional Keywords: None

Print Tag: Refer to original journal article
Comforting News After GAN Sacrifice

Long-Term Great Auricular Nerve Morbidity After Sacrifice During Parotidectomy.

Ryan WR, Fee WE:
Laryngoscope 2009; 119 (June): 1140-1146

The posterior branch of the great auricular nerve should be preserved if it does not compromise tumor resection. If this is not possible, the patient and surgeon should be comforted in that only minor, if any, long-term disability will ensue.

Background: Classically, the great auricular nerve (GAN) is sacrificed during parotidectomy in order to facilitate access to the parotid gland. GAN sacrifice is associated with multiple sequelae, including anesthesia or paresthesia, discomfort, and functional deficits. A previous study showed that, within the first year following GAN sacrifice, patients often have difficulty with shaving, combing hair, wearing earrings, using the telephone, and sleeping on the operative side. However, the long-term morbidity of GAN sacrifice has not been evaluated.

Objective: To evaluate patient perspectives and morbidity 4 to 5 years following GAN sacrifice.

Design/Participants: Prospective cohort study involving 19 patients who underwent parotidectomy with sacrifice of the anterior and posterior branch of the GAN.

Methods: All patients were treated at a single tertiary care hospital by 3 different surgeons. Each patient completed an outcomes questionnaire and underwent light touch sensory testing using a microfilament anesthesiometer in 7 predefined areas. Patients were evaluated with an average follow-up period of 54 months. Parotidectomy was performed for a diverse group of neoplasms, the majority of which were pleomorphic adenomas. None of the 19 patients demonstrated any signs of recurrence. Based on sensory testing, 47% (9 of 19) of patients had anesthesia, 58% (11 of 19) had paresthesia, and 26% (5 of 19) had no sensory loss. Overall, 50% of patients reported either almost no impact or minimal impact of GAN dysfunction on daily activities, with the remaining 50% reporting no impact. A total of 70% of patients reported that their sensory symptoms had either resolved or stabilized, with an average time to recovery of 2 years. Self-reported functional deficits were lower after 4 to 5 years than at 1 year for all tasks, including telephone use, hair combing, earring use, and sleeping. The study did not have enough participants to reach any formal statistical conclusions.

Conclusions/Reviewer’s Comments: This study suggests that the morbidity of GAN sacrifice is tolerable and shows marked improvement after the first postoperative year. It also suggests that sensory function following GAN sacrifice stabilizes after an average of 2 years. Functional deficits resulting from GAN sacrifice were usually minor, well tolerated, and occurred in a minority of patients. According to the authors, the posterior branch of the GAN should be preserved if possible. Previous studies have suggested that this is possible in more than half the cases, but that it may add up to 25 minutes to operative time. Although limited by the number of study subjects and lack of statistical power, the current study is the first to fully evaluate long-term GAN morbidity and patient impressions after GAN sacrifice.

Additional Keywords: None

Print Tag: Refer to original journal article
Medialization laryngoplasty with arytenoid adduction should be considered in selected patients with vocal fold level difference and a large posterior chink.

**Objective:** To evaluate objective acoustic and aerodynamic data of arytenoid adduction in patients with unilateral vocal fold paralysis (UVFP).

**Design/Participants:** Retrospective chart review of 85 patients with UVFP.

**Methods:** The choice of surgical treatment was determined by arytenoid position, size, and glottal gap. Acoustic (jitter, shimmer, noise:harmonic ratio) and aerodynamic (mean phonatory flow rate [MPR], maximum phonation time [MPT], subglottic pressure) parameters were studied before and after surgery. The medialization laryngoplasty (ML) group (medialization alone, injection laryngoplasty [IL]) data were compared to the medialization laryngoplasty with arytenoid adduction (AA-ML) group, with univariate and multivariate analysis of acoustic and aerodynamic measures.

**Results:** 85 patients (42 male, 43 female) completed preoperative and postoperative aerodynamic and acoustic measurements. Preoperatively, the phonatory function of the AA-ML group was worse than the ML/IL group. Postoperatively, the mean phonatory function in the AA-ML group was better in all measures, except for a higher noise-to-harmonic ratio and subglottic pressure. There was not a significant difference in preoperative or postoperative function between the groups in any of the individual aerodynamic or acoustic parameters. Multivariate analysis demonstrated significant ($P < 0.05$) differences in the degree of postsurgical change between the AA-ML and ML/IL groups in both the acoustic and aerodynamic measures.

**Conclusions:** These results demonstrate that both medialization laryngoplasty and AA-ML improve phonatory function; however, not to normal. The AA-ML patients trended toward worse preoperative function and had better postoperative function. AA-ML should be considered in selected patients with vocal fold level difference and a large posterior chink.

**Reviewer’s Comments:** Arytenoid adduction is most commonly used in patients with UVFP to correct a large posterior glottic gap or when the paralyzed fold rests in a lateralized position. Placement of a suture in the muscular process of the arytenoid mimics the action of the lateral cricoarytenoid muscle by rotating the arytenoid cartilage to medialize the posterior portion of the vocal fold. This allows for the mobile vocal fold to meet the paralyzed fold in the midline and closes the posterior glottic chink. Arytenoid adduction is associated with increased morbidity, including airway edema, dysphagia, and increased operative time, which are primarily a function of surgical access and exposure of the cricoarytenoid joint. This study is limited by its short follow-up and nonrandomized selection criteria, with selection bias toward patients with worse preoperative function and a larger posterior gap in the IL-AA group. Furthermore, a combination of quantitative and perceptual ratings would provide a multi-dimensional view of vocal function pre- and post-intervention. Use of a validated patient self-assessment questionnaire and trained perceptual grading would provide further insight into whether these aerodynamic and acoustic improvements are detectable by patients and have clinical significance.

Additional Keywords: None

Print Tag: Refer to original journal article

Fat tissues can be successfully transplanted into irradiated areas, inducing both esthetic and functional improvement.

Background: Use of high-dose radiation has added to the treatment arsenal for head and neck cancer; however, its use has significant esthetic and functional consequences for patients. As more patients are now surviving treatment with radiotherapy, these sequelae will be more commonly encountered.

Objective: To investigate use of autologous fat transplants in the head and neck for improving esthetic and functional outcome after radiation.

Methods: All subjects had received external beam radiation in the dose of ≥50 Gy. Abdominal fat was harvested and transplanted via injection with a blunt-tip needle to the involved regions of the head and neck in 11 patients. Fat was injected into both the deep and superficial subcutaneous planes. Post-injection massage was prescribed for 15 days. The follow-up period ranged from 2 to 88 months, with a mean follow-up of 40 months. Clinical outcome was assessed subjectively by physicians and objectively assessed by histological analysis.

Results: No surgical complication associated with the procedure was reported. Ten of 11 patients had both esthetic and functional improvement after fat injection. Resorption was estimated to be approximately 20% to 40%, and 6 patients required reinjection. Total volume of injection ranged from 10 cc to 105 cc. Improvement in skin quality, neck mobility, as well as phonation and chewing were noted. Histological studies of treated areas demonstrated richly vascularized fat lobules and decreased radiation fibrosis.

Conclusions: Contouring of the irradiated tissue is a surgical challenge. This study suggests that fat injection into irradiated head and neck regions is a viable method in improving functional and esthetic outcome.

Reviewer's Comments: This study suggests that fat injection can be used as a method to improve function and cosmesis in patients treated with high-dose radiation for head and neck cancer. However, multiple injections are likely to be necessary and patients need to have realistic expectations regarding the extent of improvement.

Additional Keywords: None

Print Tag: Refer to original journal article
Both smoking and sun exposure are significant negative contributors to aging, while increased body mass index can result in younger or older perceived age depending on one's chronological age.

Objective: To evaluate the contribution of environmental factors to aging in a population of identical twins, where genetic contribution to aging would be controlled.

Participants/Methods: 186 pairs of identical twins were voluntarily enrolled in the study during the annual Twins Day Festival in Ohio. A comprehensive questionnaire was completed by the participating twins soliciting information regarding exposure to various environmental factors that may accelerate or impede the aging process. Digital imaging was obtained, and the images were then graded and reviewed by a panel of 4 plastic surgeons regarding the appeared age. Perceived age differences were calculated and adjusted.

Results: Smoking contributed to an older appearance ($P<0.0001$), with each 10.0 years of smoking contributing to a 2.5-year older appearance. Increased sun exposure and a lack of sunscreen protection were also associated with an older appearance. Use of hormone replacement therapy in females was associated with a younger appearance ($P=0.002$). In patients aged <40 years, a 4-point higher body mass index (BMI) resulted in a perceivable older appearance, while the same higher BMI resulted in a more youthful appearance in patients aged >40 years ($P=0.0001$). In patients aged <55 years, an 8-point higher BMI again contributed to an older appearance, while after age 55 years, the same higher BMI was associated with a more youthful look. Hair quantity was judged to be better with a higher BMI ($P=0.01$) and use of hormone replacement therapy ($P =0.05$), but worse in patients with a history of skin cancer ($P=0.0005$).

Conclusions: This study shows that 2 main environmental determinants of the aging process, smoking and sun exposure, do indeed have significant contribution given controlled genetical factors. The impact of BMI on perceived age varies with one’s chronological age.

Reviewer’s Comments: Albeit a study based on questionnaire data, thus susceptible to errors such as recall bias, this study does by design control for genetic contribution to aging by evaluating the difference in perceived age of identical twins. This allows evaluation of contribution of purely environmental factors to the difference in perceived age between subjects.

Additional Keywords: None

Print Tag: Refer to original journal article
EHSL May Be Oncologically Appropriate With Early T Classifications

Endoscopic Horizontal Partial Laryngectomy by CO₂ Laser in the Management of Supraglottic Squamous Cell Carcinoma.

Bussu F, Almadori G, et al.;
Laryngoscope 2009; 31 (September): 1196-1206

Compared to the open approach, endoscopic laser-assisted partial supraglottic laryngectomy has comparable 5-year disease-specific survival rates.

**Background:** Transoral endoscopic partial laryngectomy using laser has become popular, and more groups have adopted these methods. The issue of feasibility has been answered, but there are still questions as to their efficacy compared to other modalities of treatment.

**Objective:** To determine whether endoscopic horizontal supraglottic laryngectomy (EHSL) by CO₂ laser compares well against open supraglottic laryngectomy (HSL).

**Design/Participants:** Retrospective review of 144 patients who underwent supraglottic laryngectomy over a 10-year period from 1996 to 2005 at a single institution in Rome. Included were patients with both primary and recurrent supraglottic squamous cell carcinoma with T1, T2, and limited T3 disease. Included in the T3 group were only those patients with pre-epiglottic involvement.

**Methods:** 78 patients underwent HSL, while 70 underwent laser-assisted EHSL. Those with extensive piriform sinus or pre-epiglottic space involvement were also excluded. Those who underwent laser surgery were selected during the diagnostic operative laryngoscopy. The 2 groups were followed for 5 years for recurrence, organ preservation, overall survival, disease-specific survival (DSS), as well as functional differences.

**Results:** In terms of DSS, there were no differences between the 2 groups. Five-year DSS was 89% for the laser group and 80% in the open group. There were no differences in terms of overall survival and organ preservation rate between groups. The only significant predictor of DSS for both groups was neck disease.

**Conclusions:** This study is consistent with other reports that endoscopic laser supraglottic laryngectomy has comparable locoregional control as the external approach.

**Reviewer’s Comments:** In the management of laryngeal cancer, selection of patients for the appropriate treatment regimen is of the utmost importance, and this article confirms this. The 2 groups compared in this paper were matched by T classification and by staging, but it is obvious from the methods and the results section that the 2 groups were not identical. The endoscopic group had more suprahyoid epiglottis and minimal pre-epiglottic involvement, while the open group had more infrahyoid epiglottis involvement. Two thirds of the endoscopic group had only T1 to 2N0 presentation. For those with T3 disease, it is unclear whether any had fixed vocal cords or paraglottic involvement. For these T1 and T2 supraglottic tumors with adequate exposure on laryngoscopy, endoscopic treatment appears to be appropriate in terms of locoregional control. These findings have been validated previously.

Additional Keywords: None

Print Tag: Refer to original journal article
Is Postop Elevation of PTH Due to Vitamin D Deficiency?

Role of Vitamin D Deficiency in Continued Hyperparathyroidism Following Parathyroidectomy.
Redman C, Bodenner D, Stack B Jr::
Head Neck 2009; 31 (September): 1164-1167

Background: Vitamin D deficiency in the American population is surprisingly high, given our obsession with use of multivitamin supplements. This underdiagnosed problem is particularly significant among those who have primary hyperparathyroidism. Unfortunately, screening for vitamin D deficiency is not routine for the work-up of primary hyperparathyroidism.

Objective: To investigate vitamin D deficiency among patients with elevated parathormone (PTH) levels after parathyroidectomy.

Design/Participants: Retrospective review of patients who had continued hyperparathyroidism (CHPT) 1 week after parathyroidectomy from 2003 to 2006.

Methods: 55 patients with complete medical records were included. CHPT was defined as persistently elevated PTH levels without any regard to calcium levels. Variables that were followed included calcium levels, sestamibi scans, vitamin D levels, intraoperative PTH values, and regimens to replenish vitamin D postop.

Results: Among 55 patients included in the study, 13 had elevated PTH values 1 week postoperatively; of these, 62% had vitamin D deficiencies, and 31% had persistent primary hyperparathyroidism. Overall, this translated to 7% who had persistent biochemical evidence of hyperparathyroidism. Most of these who had persistent primary hyperparathyroidism had sestamibi parathyroid localization of an additional adenoma. Among those who were vitamin D deficient, the drop in postop PTH as well calcium level was comparable to those without vitamin D deficiency.

Conclusions: Due to the known prevalence of vitamin D deficiency after parathyroidectomy, the authors recommend preoperative vitamin D testing to avoid confusion about the etiology of persistently elevated PTH following surgery.

Reviewer's Comments: Given the various sources of spurious PTH values after parathyroidectomy, many centers rely on postop calcium values after surgery. PTH is obtained only after hypercalcemia is determined postop. Furthermore, many endocrinologists obtain vitamin D levels preop prior to referring the patients to surgeons. Vitamin D deficiency reduces calcium absorption and skeletal resorption, thereby indirectly inducing a compensatory rise of PTH. Of course, primary hyperparathyroidism can present with normal calcium levels. In terms of this report, the data offered here are not entirely new, but they do favor preoperative screening of vitamin D levels.

Additional Keywords: None

Print Tag: Refer to original journal article
Patients treated at an academic center are more likely to have advanced-stage tumors and to receive chemoradiotherapy as their primary treatment. In analyses of matching patient subsets, there are no significant difference in patient outcomes.

**Background:** The surgical literature suggests that academic centers (ACs) that treat more cancer patients provide better care. An Italian group applied this hypothesis to head and neck cancer patients who were treated with chemoradiotherapy and suggested that better outcomes are found in coordinating centers with higher volume of patients treated in comparison to affiliate centers.

**Objective:** To determine if these potential AC advantages correspond to a difference in treatment outcome.

**Design/Methods:** Retrospective cohort study at the University of Kansas Medical Center from 1999 to 2006. Included subjects were those with squamous cell carcinoma (SCC) who had their initial evaluation performed at this AC, but their subsequent treatment was obtained either at this AC or at a non-academic center (non-AC). Whether patients were treated at the AC or non-AC, they had their tumor surveillance follow-up visits at Kansas Medical Center Department of ENT. Each patient's presenting tumor, treatment modalities, and outcomes were followed.

**Results:** 874 patients were screened, and 374 were included for analysis. Of these, 263 were treated at the AC and 101 at a non-AC. Most were oral cavity, oropharynx, or larynx SCC. Interestingly, patients treated at a non-AC were more likely to present with earlier stage tumors as well as undergo surgery as their primary treatment. Chemoradiotherapy was more likely pursued as the primary treatment at the AC. Non-AC patients tended to be treated with radiation alone rather than chemoradiotherapy, and tended to be treated with adjuvant rather than primary radiotherapy. Most importantly, there were no statistical differences in overall survival and recurrence rates between the 2 cohorts treated at the AC versus a non-AC.

**Conclusions:** Patients treated at a non-AC tended to have early stage tumors, but when matched for subsets, there were no differences in overall survival or recurrence between those treated at the AC versus those treated at a non-AC.

**Reviewer's Comments:** In this limited retrospective cohort analysis, the authors disagreed with the Italian study (Benasso et al, *Eur J Cancer*, 2003; 39:1895-1898) that suggested better radiotherapy outcomes can be achieved in academic centers. One criticism of this report is that the initial evaluation and the tumor surveillance were carried out at an academic ENT department that probably work closely with the AC center. As such, even though the patients were treated with radiotherapy at a non-AC, the management recommendations may have originated from the AC center. It is unclear, then, if there were any differences outside of simple geographic location. It should also be noted that the non-AC had more early stage tumors, and this did not translate into better overall survival or recurrence rates. The subset analysis failed to show any outcome differences in this study, but there is an inherent bias in this study.

Additional Keywords: None

Print Tag: Refer to original journal article
The authors of this study recommend that serious consideration be given to pectoralis myofascial flap after salvage total laryngectomy to reduce the rate of fistula occurrence postoperatively.

**Background:** In the era of chemoradiation for laryngeal cancer, there has been an increased concern for pharyngocutaneous fistula after salvage total laryngectomy. Some have reported the fistula rate to be as high as 50%. Previous reports suggested that various myofascial flaps may reduce the occurrence of fistula.

**Objective:** The authors determine whether pectoralis flap will reduce the rate of fistula occurrence after salvage laryngectomy.

**Design/Methods:** This is a prospective cohort study at a tertiary public hospital from 2003 to 2008. Included were those who required salvage total laryngectomy after either primary radiation treatments or primary chemoradiation treatments for laryngeal malignancies. All had the defect closed primarily at the time of surgery. Excluded were those who underwent previous laryngeal surgeries, salvage laryngo-pharyngectomies, and other primary tumor sites. The 2 cohorts were those who had pectoralis flap as an added layer of closure and those who only had primary mucosal closure. In the first 2 years, patients only had primary closure, while the pectoralis group was added in the 3 following years. All mucosal defects were closed with interrupted Vicryl in a layered T fashion using a Connell inverted stitch. The pectoralis flap layer was kept in place with tacking sutures of the defect. The main outcome measure was pharyngocutaneous fistula formation and type of postoperative long-term feeding method.

**Results:** 43 patients were initially included in the study, and 17 patients had salvage laryngectomy. For both primary and salvage laryngectomies, the baseline fistula rate ranged from 24% to 27%. Among the group who underwent salvage laryngectomy, 7 patients had no pectoralis flap and 10 patients had pectoralis flap. Four of 7 patients who had no pectoralis developed pharyngocutaneous fistula, while no one who had the pectoralis flap developed fistula. These numbers were statistically significant ($P < 0.02; 0\% \text{ to } 23\%; 95\% \text{ CI}$).

**Conclusions:** The authors recommend serious considerations to pectoralis myofascial flap after salvage total laryngectomy to reduce the rate of fistula occurrence postoperatively.

**Reviewer's Comments:** There are several criticisms to this paper. One obvious point is that there were a small number of patients. One group had 7 and the other group had only 10. However, the result achieved in light of these small sample values is still remarkable. Another source of bias is that the group with the pectoralis flap was operated on in the latter half of the series. Those undergoing pectoralis closure may have had more experienced surgeons performing the mucosal closure. Lastly, 60% of the pectoralis group had chemoradiation while 71% of the non-pectoralis group had chemoradiation. However, despite these inherent biases in the study, the results are convincing and consistent with others who recommend added layer of myofascial flap closure for salvage laryngectomy.

Additional Keywords: None

Print Tag: Refer to original journal article
Behavioral benefits of adenotonsillectomy for pediatric patients with sleep-disordered breathing tend to shrink over time.

**Background:** The authors previously reported short-term benefits of adenotonsillectomy for sleep-disordered breathing. These reports attracted attention when they noted short-term benefits for attention-deficit hyperactivity disorder (ADHD) and improvements in behavior. The same group therefore followed this population to study their long-term benefits.

**Objective:** To determine whether previously published changes are maintained over time in children after adenotonsillectomy for sleep-disordered breathing (SDB) using the validated Pediatric Sleep Questionnaire (PSQ) and the Conners Parent Rating Scale-Revised: Short Form (CPRS-R:S).

**Design:** Prospective nonrandomized study at a single academic institution.

**Methods:** This study is an extension of a previous study by the authors on their database of pediatric populations who were diagnosed with SDB. Using the validated PSQ and the CPRS-R:S, long-term follow-up data were collected from the parents at least 2 years after surgery. Outcome measures were sleep behaviors, oppositional behaviors, cognitive problems, inattention, hyperactivity, and ADHD index. Linear mixed models were used for statistical analysis.

**Results:** Of the 117 patients enrolled in the original study, 43 completed the CPRS survey and 44 completed the PSQ survey. At 2.5 years, there was a statistically significant reduction in the PSQ score by 58% with respect to the baseline score. Compared to the 6-month follow-up study, there was a statistically significant increase in the PSQ score. In terms of the Conners behavioral scores, there was no difference in the ADHD index, but there were statistical reductions in cognitive problems/inattention category, hyperactivity, and oppositional behavior.

**Conclusions:** Long-term benefits of adenotonsillectomy were noted in the PSQ as well as the behavioral CPRS instrument. Improvements were not as great as the short-term measurement 6 months postoperatively, but improvements in behavior were maintained in most categories of the Conners scores, except for the ADHD index.

**Reviewer’s Comments:** There have been several controversies with regard to adenotonsillectomy for behavioral problems. The authors reported the short-term benefits of adenotonsillectomy in the pediatric populations with SDB. They followed the same group longitudinally and studied their long-term benefits. Of course, the obvious bias is that since this is the group that had significant benefits as measured by the same instruments in the short-term, the long-term benefits would still be present in this population. Surprisingly, the measured benefits were still present, but these "benefits" tended to be not as strong. In statistical terms, the authors calculated that it would take around 9 to 10 years for the benefits to wear off. Given that the relationship between SDB and pediatric behavioral problems are multifactorial, this article provides more incentive to study the relationship between the adenotonsillectomy and behavioral changes.

**Additional Keywords:** None

**Print Tag:** Refer to original journal article