

Abstract Selection

Functional outcome after gamma knife surgery or microsurgery for vestibular schwannomas. Regis, J., Pellet, W., Delsanti, C., Dufour, H., Roche, P. H., Thomassin, J. M., Zanaret, M., Peragut, J. C. Department of Stereotactic and Functional Neurosurgery, Timone Hospital, Marseille, France. jregis@ap-hm.fr *Journal of Neurosurgery* (2002) November, Vol. 97 (5), pp. 1091–100.

OBJECT: Microsurgical excision is an established treatment for vestibular schwannoma (VS). In 1992 the authors used a patient questionnaire to evaluate the functional outcome and quality of life in a series of 224 consecutive patients. In addition, starting with gamma knife surgery (GKS) in 1992, the authors decided to use the same methodology to evaluate prospectively the results of this modality to compare the two alternatives. **METHODS:** Among the 500 patients who were included prospectively, the authors only evaluated patients in whom GKS was the primary treatment for unilateral VS. Four years of follow up was available for the first 104 consecutive patients. Statistical analysis of the GKS and microsurgery populations has shown that only a comparison of Stage II and III (according to the Koos classification) was meaningful in terms of group size and preoperative risk factor distribution. Objective results and questionnaire answers from the first 97 consecutive patients were compared with the 110 patients in the microsurgery group who fulfilled the inclusion criteria. Questionnaire answers indicated that 100 per cent of patients who underwent GKS compared with 63 per cent of patients who underwent microsurgery had no new facial motor disturbance. Forty-nine per cent of patients who underwent GKS (17 per cent in the microsurgery study) had no ocular symptoms, and 91 per cent of patients treated with GKS (61 per cent in the microsurgery study) had no functional deterioration after treatment. The mean hospitalization stay was three days after GKS and 23 days after microsurgery. All the patients who underwent GKS who had been employed, except one, had kept the same professional activity (56 per cent in the microsurgery study). The mean time away from work was seven days for GKS (130 days in the microsurgery study). Among patients whose preoperative hearing level was Class 1 according to the Gardner and Robertson scale, 70 per cent preserved functional hearing after GKS (Class 1 or 2) compared with only 37.5 per cent in the microsurgery group. **CONCLUSIONS:** Functional side effects happen during the first two years after radiosurgery. Findings after four years of follow up indicated that GKS provided better functional outcomes than microsurgery in this patient series.

Botox treatment in adductor spasmodic dysphonia: a meta-analysis. Boutsen, F., Cannito, M. P., Taylor, M., Bender, B. Department of Communication Sciences and Disorders, University of Oklahoma, Norman, USA. Frank-Boutsen@ouhsc.edu *Journal of Speech, Language and Hearing Research* (2002) June, Vol. 45 (3), pp. 469–81.

Over the years many studies have been conducted to document the treatment effects of Botulinum toxin type A in adductor spasmodic dysphonia. The results of these studies have led to the view that overall Botulinum toxin treatment is moderately effective. This study reviews efficacy research qualitatively and quantitatively to determine the extent to which this conclusion is fully supported by the data. Although the data indicate moderate overall improvement as a result of Botulinum toxin treatment, they also suggest significant variation across patients, measurements, and treatment conditions. This result, together with methodological limitations and lack of standardization in BT efficacy research, justifies caution when making inferences regarding BT treatment benefit in adductor spasmodic dysphonia.

Effect of prostaglandin E1 on idiopathic sudden sensorineural hearing loss: a double-blinded clinical study. Ogawa, K., Takei, S., Inoue, Y., Kanzaki, J., *et al.* Department of Otolaryngology,

School of Medicine, Keio University, Tokyo, Japan. ogawak@sc.itc.keio.ac.jp *Otology and Neurotology* (2002) September, Vol. 23 (5), pp. 665–8.

OBJECTIVE AND STUDY DESIGN: The authors conducted a prospective, randomized, double-blinded clinical trial for the purpose of elucidating the effects of prostaglandin E1 (PGE1) on idiopathic sudden sensorineural hearing loss. **SETTING AND PATIENTS:** With the approval of the institute ethics committee, a total of 57 consecutive patients with diagnoses of idiopathic sudden sensorineural hearing loss were included in the study. The patients in the PGE1 group received continuous infusion containing 60 microg PGE1 and 100 mg hydrocortisone for seven days, and the patients in the placebo group were treated with continuous infusion containing an inactive placebo and 100 mg hydrocortisone. **RESULTS:** No significant differences were observed in the improvements of pure-tone average and subjective symptoms between the PGE1 and the placebo groups. However, the hearing improvement at high frequencies (4 kHz and 8 kHz) was significantly higher in the PGE1 group than in the placebo group, especially in the patients with severe tinnitus. **CONCLUSIONS:** These results failed to prove a beneficial effect of PGE1 in the treatment of idiopathic sudden sensorineural hearing loss. Further studies will be needed to clarify the pharmacologic actions of PGE1 in the cochlea.

Cost-benefit analysis of pediatric cochlear implantation: German experience. Schulze, G. H., Illg, A., Schoenermark, M., Lenarz, T., Lesinski, S. A., *et al.* The Boston Consulting Group, Hamburg, Germany. schulze-gattermann.heide@bcg.com. *Otology and Neurotology* (2002) September, Vol. 23 (5), pp. 674–81.

HYPOTHESIS: To explore, from the payers' perspective, the cost-benefit ratio of pediatric cochlear implantation for congenitally deaf and prelingually deafened children compared with children with hearing aids. The study should verify the hypothesis that educational and associated costs increase with age at implantation and that these can be below costs for children with hearing aids. **METHODS:** Children who received implants at the Medical University of Hanover at different ages (Group 1, 0–1.9 yr; Group 2, 2–3.9 yr, Group 3, 4–6.9 yr) were compared with deaf children using hearing aids (Group 4). Sick funds were the payers for direct and indirect costs, and public authorities were the payers for educational costs. Educational settings were used to measure for benefits. All costs related to the hearing deficiency were included up to the age of 16 years on the basis of 1999 currency values. A scenario analysis was used to explore the impact of variation of costs and discount rates. **RESULTS:** Total costs for the three age groups of children with implants were from euro 138,000 (approximately US\$ 113,100) to euro 177,000 (approximately US\$ 152,700), compared with euro 160,000 (approximately US\$ 138,000) for hearing aid users. **CONCLUSION:** This study supports the view that pediatric cochlear implantation provides positive cost-benefit ratios compared with hearing aid users, depending on the age at implantation. Implantation is strongly recommended from the payers' perspective for children implanted before the age of two years.

Hearing restoration with auditory brainstem implant in three children with cochlear nerve aplasia. Colletti, V., Carner, M., Fiorino, F., Sacchetto, L., Miorelli, V., Orsi, A., Cilurzo, F., Pacini, L., *et al.* Ear, Nose and Throat Department, University of Verona, Italy. entdept@libero.it. *Otology and Neurotology* (2002) September, Vol. 23 (5), pp. 682–93.

OBJECTIVE: To verify the possibility of auditory habilitation in children with aplasia and hypoplasia of the cochlear nerve by direct electrical stimulation of the cochlear nuclei with an auditory brainstem implant. **STUDY DESIGN:** Retrospective case review. **SETTING:** Study conducted at the Ear, Nose and Throat

Department of the University of Verona, Italy. **PATIENTS:** Three children, aged four, three and two years, respectively, with severe bilateral cochlear malformations and cochlear nerve aplasia have received an auditory brainstem implant at this institution in the past two years. **INTERVENTION:** The classic retrosigmoid approach was used. Correct positioning of the electrodes was evaluated using electric auditory brainstem responses and neural response telemetry. Before the patients were discharged, high-resolution computed tomography with a bone algorithm reconstruction technique was performed to evaluate electrode placement. The auditory brainstem implant was activated 30 to 60 days after implantation. **RESULTS:** No postoperative complications were observed. To date, 21, 18, and eight electrodes, respectively, have been activated in the three children. The first patient, 12 months after activation, had achieved good environmental sound awareness, good speech detection, and some speech recognition. The second child, eight months after activation, had achieved good environmental sound awareness and moderate speech detection. The third patient, one month after activation, had obtained good environmental sound awareness. **CONCLUSION:** This study indicates that auditory brainstem implantation is technically feasible in children with cochlear nerve aplasia. The early results suggest the possibility of achieving auditory habilitation with auditory brainstem implantation in this population.

cDNA microarray analysis of vestibular schwannomas. Welling, D. B., Lasak, J. M., Akhrametyeva, E., Ghaehri, B., Chang, L. S., *et al.* Department of Otolaryngology, Ohio State University College of Medicine, Ohio, USA. welling.1@osu.edu. *Otology and Neurotology* (2002) September, Vol. 23 (5), pp. 736–48.

BACKGROUND: Vestibular schwannomas are known to harbor mutations in the neurofibromatosis type 2 tumor suppressor gene, but the mechanism of the neurofibromatosis type 2 tumour suppressor gene action is not well understood. Identification of genes differentially expressed in normal and diseased tissues through the use of a large-scale, cDNA microarray approach may lead to increased understanding of pathways that lead to tumour formation. **OBJECTIVE:** The objectives of this study were to evaluate the gene expression profiles in vestibular schwannomas in comparison with normal vestibular nerve tissues and to identify pathways that may be altered in schwannomas. **METHODS:** Total RNA was extracted from one normal vestibular nerve and seven vestibular schwannomas. The normal vestibular nerve was from one of the seven patients with small vestibular schwannomas. Radiolabelled cDNA was synthesized and hybridized to cDNA microarray filters that contained 25,920 known genes or expressed sequence tags. Expression profiles were imaged and analysed. Selected genes that showed three-fold or greater difference in the intensity between the normal nerve and the schwannomas were further examined by real-time polymerase chain reaction and by immunohistochemical staining. **RESULTS:** Forty-two genes (0.2 per cent) were upregulated three-fold or more in at least five of the seven tumours when the filter images were compared with a normal adjacent vestibular nerve. Among them, osteonectin, an angiogenesis mediator, and RhoB GTPase, which is important in cell signalling, were significantly upregulated in five of seven tumours. Among genes that were downregulated, an apoptosis-related LUCA-15 gene was highly underexpressed in six of seven schwannomas when compared with the normal nerve. Also, ezrin, a relative of the NF2 protein, was significantly downregulated in five of seven tumours. Real-time PCR and immunohistochemistry data support the cDNA microarray findings. **CONCLUSION:** Our cDNA microarray analysis of schwannomas suggested several interesting and potentially important tumorigenesis pathways associated with vestibular schwannoma formation. Further *in vivo* study is necessary to define the roles of these identified genes and their potential relationships with the neurofibromatosis type 2 tumour suppressor gene.

Telomerase activity, telomere length, and apoptosis: a comparison between acquired cholesteatoma and squamous cell carcinoma. Watabe, R. M., Rudolph, K. L., Averbek, T., Buhr, T., Lenarz, T., Stoeber, T., *et al.* Department of Otorhinolaryngology, Medical University of Hannover, Germany. *Otology and Neurotology* (2002) September, Vol. 23 (5), pp. 793–8.

BACKGROUND: Cholesteatoma disease is characterized by accumulation of keratinizing epithelium. Several molecular markers of tumour formation have been found in cholesteatoma

(e.g. upregulation of matrix metalloproteinases, c and activation of angiogenesis). Other molecular findings clearly distinguish between cholesteatoma and malignant tumours (e.g. lack of chromosomal instability, intact checkpoint responses). To further distinguish the molecular mechanisms in cholesteatoma from malignant tumours, the authors determined telomerase activity and telomere length in both tissue types. **METHODS:** To evaluate the role of telomerase activation and telomere length in cholesteatoma, 29 cholesteatoma samples and nine squamous cell carcinomas were analysed for telomerase activity and telomere length. In addition, the rate of apoptosis was determined in both groups, using the TdT-mediated dUTP nick end labeling technique. **RESULTS:** As previously described, a high proportion of squamous cell carcinoma exhibited telomerase activity (6/9, 66 per cent). By contrast, a significantly lower rate of telomerase activity was found in cholesteatoma samples (1/29, 3.4 per cent, $p = 0.0002$). Despite the differences in telomerase activity, the telomere length was similar in cholesteatoma (mean length 7.43 kb) and in squamous cell carcinoma (mean length 7.99 kb; difference not significant, $p = 0.1364$). The low rate of telomerase activity in cholesteatoma was accompanied by significantly higher rates of apoptosis in cholesteatoma (mean 30 per cent) compared with squamous cell carcinoma tissue (mean three per cent, $p = 0.0031$). **CONCLUSIONS:** Taken together, these data show that telomerase activation is a rare event in cholesteatoma and that the absence of telomerase activity is accompanied by high rates of apoptosis in cholesteatoma. It is proposed that the absence of telomerase limits the proliferative capacity of cholesteatoma by induction of apoptosis, whereas the presence of telomerase allows immortal growth of squamous cell carcinoma.

Management of pharyngoesophageal (Zenker's) diverticulum: which technique? Gutschow, C. A., Hamoir, M., Rombaux, P., Otte, J. B., Goncette, L., Collard, J. M., *et al.* Unit of Upper G-I Surgery, Louvain Medical School, Brussels, Belgium. *The Annals of Thoracic Surgery* (2002) November, Vol. 74 (5), pp. 1677–82.

BACKGROUND: Incomplete symptomatic relief of pharyngoesophageal (Zenker's) diverticulum after endoscopic stapling or laser division has been reported by some authors. The clinical relevance of cricomyotomy, although supported by experimental data, remains controversial. **METHODS:** Operative procedures consisted of transcervical resection ($n = 34$, group I), transcervical resection plus cricomyotomy ($n = 12$, group II), transcervical cricomyotomy ($n = 8$, group III), transcervical resection plus diverticulopexy ($n = 47$, group IV), endoscopic stapling division ($n = 31$, group V), and endoscopic laser division ($n = 55$; group VI). **RESULTS:** The percentage of totally asymptomatic patients was significantly ($p = 0.004$) higher after open procedures (combined groups I to IV) than after endoscopic treatment (combined groups V and VI) regardless of the size of the pouch (3 cm, 85 per cent vs 25 per cent; $> \text{ or } = 3 \text{ cm}$, 86 per cent vs 50 per cent). The percentage of patients with no or occasional (i.e. fewer than twice a week) symptoms was significantly ($p = 0.001$) higher after open procedures (98 per cent) than after endoscopic treatment (57 per cent) for less than 3 cm diverticula whereas it was not higher ($p = 0.409$) for 3 cm or greater pouches (open, 97 per cent; endoscopic, 88 per cent). Furthermore, this percentage was similar ($p > 0.286$) after endoscopic stapling division and after endoscopic laser division (3 cm, 50 per cent vs 58 per cent; $> \text{ or } = 3 \text{ cm}$, 96 per cent vs 80 per cent). It was also similar ($p > 0.197$) after resection alone (group I) and after open operations including myotomy (combined groups II to IV) (3 cm, 100 per cent vs 98 per cent; $> \text{ or } = 3 \text{ cm}$, 92 per cent vs 100 per cent). Unlike endoscopic stapling and division, laser division was complicated by mediastinitis (two patients), and one patient was referred because of cervical esophageal disruption during laser division. Five of six postoperative fistulas after resection occurred in patients who did not have myotomy, and four patients were referred 12 to 49 years after resection without myotomy for true recurrence of the pouch. **CONCLUSIONS:** Open techniques afford better symptomatic relief than endoscopic techniques, especially in patients with small diverticula. Endoscopic stapling and division is safer than laser division. Although very effective at midterm, resection without myotomy predisposes to the development of postoperative fistula and to recurrence of the pouch after many years.

Model for experimental revascularized laryngeal allotransplantation. Birchall, M. A., Bailey, M., Barker, E. V., Rothkoetter, H. J., Otto, K., Macchiarini, P., *et al.* Department of University of Bristol, Bristol, UK. martin.birchall@bristol.ac.uk. *The British Journal of Surgery* (2002) November, Vol. 89 (11), pp. 1470–5.

BACKGROUND: Although a human laryngeal transplant has been undertaken successfully, important questions remain that require a suitable animal model. **METHODS:** A pig model for allotransplantation has been developed. Organ perfusion was studied in nine animals before four transplants were performed in congenic (unrecovered) animals and eight in unmatched (recovered) animals. Larynges were regularly examined endoscopically until death at 14 days. Immunosuppression included the use of tacrolimus. Revascularization was achieved by anastomosing the donor right cervical vascular tree to the recipient common carotid. In recovered animals, four allografts were placed orthotopically and four heterotopically. **RESULTS:** The pig larynx was perfused adequately via the right cervical vascular tree and congenic grafts were well tolerated. Of eight allografts, seven were well tolerated and remained healthy for the duration of the study (14 days). One allograft became infected between days four and seven after operation. Median operating time was six hours, with a median cold ischaemia time of three hours. **CONCLUSION:** Revascularized allotransplants of the larynx can be undertaken reliably in pigs and this provides a preclinical model for studies of laryngeal transplantation.

Endoscopic partial adenoidectomy for children with submucous cleft palate. Finkelstein, Y., Wexler, D. B., Nachmani, A., Ophir, D., *et al.* Palate Surgery Unit of the Department of Otolaryngology–Head and Neck Surgery, Meir Hospital, Sapir Medical Center, Kfar-Saba, Israel. fiyehuda@netvision.net.il *The Cleft Palate Craniofacial Journal* (2002) September, Vol. 39 (5), pp. 479–86.

OBJECTIVE: Children with submucous cleft palate who suffer from chronic nasal obstruction because of hypertrophic adenoids usually are not subjected to adenoidectomy because of the fear of postoperative velopharyngeal insufficiency. These patients present a therapeutic challenge because we are aware more than ever of the importance of normal nasal breathing and nocturnal respiration, especially during childhood. Our hypothesis was that transnasal endoscopic horizontal limited adenoidectomy may relieve nasal obstruction while preserving the function of the velopharyngeal valve. The objective of this study was to evaluate the efficacy of transnasal endoscopic horizontal partial adenoidectomy in patients with submucous cleft palate and adenoidal hypertrophy. **SETTING:** Patients were either referred to the outpatient clinic of the Palate Surgery Unit (seven patients) or were patients referred to the senior author's (Y.F.) private clinic. All the patients had been operated on by this senior author (Y.F.). **PATIENTS:** Ten children aged 3.5 to 13 years (six girls and four boys) with submucous cleft palate and hypertrophic adenoids were included in the study. All the patients were hyponasal and suffered nasal obstruction, loud snoring, and episodes of apnea. **INTERVENTIONS:** Endoscopic partial adenoidectomy was accomplished to open the lower third of the choanae. Nasal breathing was achieved in all the patients, and only mild snoring remained in two patients. The hyponasality disappeared and speech intelligibility normalized. Mild hypernasality developed in two patients but was still perceived as an overall improvement in speech. **CONCLUSIONS:** Transnasal endoscopic horizontal partial adenoidectomy may be an effective surgical method for relief of nasal obstruction while preserving velopharyngeal valve function in patients with submucous cleft palate who suffer from obstructive adenoids.

Hearing loss following intratympanic instillation of gentamicin for the treatment of unilateral Meniere's disease. Kaplan, D. M., Nedzelski, J. M., Al Abidi, A., Chen, J. M., Shipp, D. B., *et al.* Department of Otolaryngology, Sunnybrook and Women's College Health Science Centre and the University of Toronto, Ontario. *The Journal of Otolaryngology* (2002) April, Vol. 31 (2), pp. 106–11.

OBJECTIVE: To determine the incidence, extent, and time course of hearing loss following instillation of intratympanic gentamicin using a predetermined fixed protocol for incapacitating unilateral Meniere's disease and to determine whether such loss is associated with any identifiable risk factors. **STUDY DESIGN:** A retro-

spective analysis of all patients treated with intratympanic gentamicin between 1988 and 1998 using American Academy of Otolaryngology–Head and Neck Surgery reporting guidelines (1985 and 1995). A predetermined regimen using a fixed dose (gentamicin 26.7 mg/ml administered three times daily for four consecutive days) was used. **METHODS:** The records of patients treated with this particular protocol were reviewed. The relationship between pretreatment hearing acuity, pretreatment bithermal caloric response, duration of symptoms, and previous treatment to post-treatment hearing were analysed with respect to hearing. **RESULTS:** Complete vestibular and audiologic data over a minimum two-year follow-up were available for 85 individuals. Sixty-three patients (74.1 per cent) had unchanged or improved hearing, and 22 patients (25.9 per cent) realized hearing loss. In 80 per cent of the latter, it occurred during the first month post-treatment. When hearing acuity at the one-month post-treatment interval remained unchanged (91.1 per cent), it was likely to remain so over the next 23 months. A significantly higher incidence of profound hearing loss was noted in patients who developed hearing loss in the first month, as compared with those who developed hearing loss at a later period ($p = 0.0207$, relative risk = 1.5). Re-treatment was not associated with hearing loss. The only identifiable risk factor for developing hearing loss was pretreatment hearing acuity stages 3 and 4 (pure-tone average > 40 dB) ($p = 0.022$, relative risk = 1.5). **CONCLUSION:** Hearing loss is a recognized complication of treatment with intratympanic gentamicin, occurring in approximately 26 per cent of individuals. In those individuals in whom hearing acuity has remained unchanged after the first month interval, significant worsening of hearing is unlikely, and patients can be reassured accordingly.

Tonsillectomy and adenotonsillectomy for recurrent throat infection in moderately affected children. Paradise, J. L., Bluestone, C. D., Colborn, D. K., Bernard, B. S., Rockette, H. E., Kurs, L. M. Department of Pediatrics, Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania 15213-2583, USA. jpar@pitt.edu. *Pediatrics* (2002) July, Vol. 110 (1 Pt 1), pp. 7–15.

OBJECTIVE: In previous clinical trials involving children severely affected with recurrent throat infection (seven or more well-documented, clinically important, adequately treated episodes of throat infection in the preceding year, or five or more such episodes in each of the two preceding years, or three or more such episodes in each of the three preceding years), we found tonsillectomy efficacious in reducing the number and severity of subsequent episodes of throat infection for at least two years. The results seemed to warrant the election of tonsillectomy in children meeting the trials' stringent eligibility criteria but also provided support for nonsurgical management. We undertook the present trials to determine 1) whether tonsillectomy would afford equivalent benefit in children who were less severely affected than those in our earlier trials but who nonetheless had indications for tonsillectomy comparable to those in general use, and 2) whether, in such children, the addition of adenoidectomy would confer additional benefit. **METHODS:** We conducted two parallel randomized, controlled trials in the Ambulatory Care Center of Children's Hospital of Pittsburgh. To be eligible, children were required to have had a history of recurrent episodes of throat infection that met standards slightly less stringent than the standards used in our earlier trials regarding either the frequency of previous episodes or their clinical features or their degree of documentation, but not regarding >one of these parameters. These reduced standards were nonetheless more stringent than those in current official guidelines, which list 'three or more infections of tonsils and/or adenoids per year despite adequate medical therapy' as an indication for tonsillectomy or adenotonsillectomy. Of 2174 children referred by physicians or parents, 373 met the current trials' eligibility criteria and 328 were enrolled. Of these, 177 children without obstructing adenoids or recurrent or persistent otitis media were randomized to either a tonsillectomy group, an adenotonsillectomy group, or a control group (the three-way trial), and 151 children who had one or more such conditions were randomized to either an adenotonsillectomy group or a control group (the two-way trial). Outcome measures were the occurrence of episodes of throat infection during the three years of follow-up; other, indirect measures of morbidity; and complications of surgery. **RESULTS:** By various measures, the incidence of throat infection was significantly lower in surgical groups than in corresponding control groups during each of the three follow-up

years. However, even among control children, mean rates of moderate or severe episodes were low, ranging from 0.16 to 0.43 per year. Adenotonsillectomy was no more efficacious than tonsillectomy alone. Of 203 children treated with surgery, 16 (7.9 per cent) had surgery-related complications of varying types and severity. **CONCLUSIONS:** The modest benefit conferred by tonsillectomy or adenotonsillectomy in children moderately affected with recurrent throat infection seems not to justify the inherent risks, morbidity, and cost of the operations. We conclude that, under ordinary circumstances, neither eligibility criteria such as those used for the present trials nor the criterion for surgery in current official guidelines are sufficiently stringent for use in clinical practice.

Bilateral hearing aids – effects and consequences from a user perspective. Koejbler, S., Rosenhall, U., Hansson, H. Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden. susanne.kobler@cns.ki.se. *Scandinavian Audiology* (2001) Vol. 30 (4), pp. 223–35.

The present study assesses the experiences with bilateral amplification in a group of 144 people provided with two hearing aids between May 1994 and July 1997. Two-thirds of the participants preferred to use both prescribed hearing aids. The participants reported that they used their hearing aids frequently. Bilateral amplification was appreciated especially for recognizing speech, for sound localization and for superior sound quality. Situations in which the subjects showed the highest appreciation of two hearing aids were when attending lectures and theatre performances and for communication in noisy background situations. There were statistically significant differences between users of bilateral and unilateral hearing aids regarding judgement of sound quality of hearing aid processed signals and localization ability in favour of bilateral hearing aid amplification. The self-assessed advantages of bilateral amplification demonstrated in this study should motivate a generous prescription strategy of two hearing aids.

Age and noise-induced hearing loss. Toppila, E., Pyykkö, I., Starck, J. Department of Physics, Finnish Institute of Occupational Health, Helsinki. esko.toppila@occuphealth.fi. *Scandinavian Audiology* (2001), Vol. 30 (4), pp. 236–44.

The purpose of the study was to evaluate the effect of noise, age and confounders in noise-induced hearing loss (NIHL). Information about work exposure, the use of hearing protective devices, audiogram, environmental and biological factors was collected from 406 paper mill workers exposed to noise levels of 91–94 dB(A), 124 forest workers exposed to noise levels of 96–99 dB(A) and 176 shipyard workers exposed to noise levels 95–97 dB(A). In addition to noise exposure, we collected the following confounders: smoking habits, serum cholesterol, systolic or diastolic blood pressure and use of analgesics. Subjects were classified based on median values, into high- and low-risk groups. The confounders were a significant source of hearing loss (HL) in younger and elderly groups of subjects, serum cholesterol level being the most important. In risk analysis the confounders partly masked the effects of noise in the development of HL. For subjects with less than two confounders, occupational noise exposure determined the development of NIHL. As the number of confounders increased, the noise exposure was overruled by these factors in the development of HL. In analysis where the subjects were matched with pairs by age, exposure, blood pressure and serum cholesterol level, the elderly subjects were more susceptible to NIHL than younger subjects. Factors independently but causally related to age were important in the development of NIHL among workers exposed to noise levels below 98 dB(A).

Hepatocyte growth factor and its receptor c-met in rat and rabbit vocal folds. Hirano, S., Thibeault, S., Bless, D. M., Ford, C. N., Kanemaru, S. I. Department of Surgery, University of Wisconsin-Madison, 53792, USA. *The Annals of Otolaryngology, Rhinology and Laryngology* (2002) August, Vol. 111 (8), pp. 661–6.

Vocal fold fibrotic scar is characterized by fibrosis of the lamina propria and epithelium, and is difficult to treat. Hepatocyte growth factor (HGF) has antifibrotic activity and has received attention as a possible therapeutic alternative to treat fibrosis. In this study, in order to clarify whether HGF can be involved in vocal fold scarring, we examined the existence of HGF and its receptor, c-Met, in rat vocal folds, and then the activity of HGF in rabbit injured vocal folds, using immunohistochemistry and enzyme-

linked immunosorbent assay. We found HGF and c-Met on epithelial cells and gland cells of the rat vocal folds. On the injured vocal folds of rabbits, little HGF was observed immediately after injury, but prominent activity occurred simultaneously with reepithelialization of the vocal fold mucosa on days 10 to 15. The activity of HGF was observed on fibroblasts in the lamina propria, as well as the epithelium. It is suggested that HGF in the vocal folds is produced by the fibroblasts and delivered to the epithelium. The implication of these findings is that HGF is involved in wound healing of the vocal fold, and may provide an alternative approach in preventing and treating vocal fold scarring.

Type I thyroplasty for acute unilateral vocal fold paralysis following intrathoracic surgery. Abraham, M. T., Bains, M. S., Downey, R. J., Korst, R. J., Kraus, D. H. Head and Neck Service and Speech, Hearing and Rehabilitation Center, New York, New York, USA. *The Annals of Otolaryngology, Rhinology and Laryngology* (2002) August, Vol. 111 (8), pp. 667–71.

Patients who undergo intrathoracic operative procedures for malignancy may require sacrifice of a recurrent laryngeal nerve. Postoperative vocal fold paralysis may lead to diminished cough with secretion retention, aspiration, and life-endangering pneumonia. This study retrospectively reviews our institution's experience of 23 patients who underwent type I thyroplasty within the two-week (acute) period after thoracic surgery. Primary lung cancer (n=16) was the most common disease. Upper lobectomy (n=9) and pneumonectomy (n=7) were the most frequent surgical procedures. Silicone medialization alone (n=11) or with arytenoid adduction (n=12) was performed. There were no significant postoperative complications. Improvements in hoarseness (86 per cent), dyspnea (72 per cent), dysphagia (50 per cent), and aspiration (79 per cent) were noted. Pulmonary status improved after vocal fold medialization, as reflected by decreased need for therapeutic bronchoscopy in the majority of patients in the postoperative period. Type I thyroplasty for vocal fold paralysis in the acute phase following thoracic surgery is well tolerated and is associated with improved patient outcome with no postoperative deaths in this high-risk patient population.

T(H)2 cytokine expression in atopic children with otitis media with effusion. Sobol, S. E., Taha, R., Schloss, M. D., Mazer, B. D., Manoukian, J. J., Tewfik, T. L., Hamid, Q. Department of Otolaryngology, McGill University, Montreal, Quebec, Canada. *The Journal of Allergy and Clinical Immunology* (2002) July, Vol. 110 (1), pp. 125–30.

BACKGROUND: Otitis media with effusion (OME) is more common in atopic children. Few studies have looked for the presence of inflammatory mediators in the middle-ear effusions of this population. **OBJECTIVE:** We hypothesize that atopic children with OME have a different inflammatory cell and cytokine profile than nonatopic patients with the disease. **METHODS:** Twenty-six patients with OME undergoing myringotomy and ventilation tube placement were recruited at the McGill University Hospital Center. The atopic status was determined for each patient by using standard skin testing. By means of immunocytochemistry, fluid specimens were assessed for T lymphocytes (CD3), eosinophils (major basic protein), neutrophils (elastase), mast cells (tryptase), and basophils (BB1). By using in situ hybridization, the expression of IL-4, IL-5, and IFN-gamma was assessed. **RESULTS:** There is a higher percentage of eosinophils and T lymphocytes in atopic patients with OME (n=8) compared with that seen in nonatopic patients (n=18, p<0.01). There is a higher percentage of neutrophils in nonatopic patients with OME compared with that seen in atopic patients (p<0.01). In examining cytokine profiles, there is a higher percentage of cells expressing IL-4 and IL-5 in atopic patients with OME compared with that seen in nonatopic patients (p<0.01). **CONCLUSION:** The predominance of eosinophils, T lymphocytes, and T(H)2 mediators in the middle-ear effusions of atopic children provides evidence that allergy might play a role in the pathogenesis of OME.

Visual vestibular mismatch in patients treated with intratympanic gentamicin for Meniere's disease. Longridge, N. S., Mallinson, A. I., Denton, A. Vancouver Hospital and Health Sciences Centre, British Columbia. *The Journal of Otolaryngology* (2002) February, Vol. 31 (1), pp. 5–8.

OBJECTIVE: To support the hypothesis that the symptom complex known as visual vestibular mismatch (VVM) can be

induced by peripheral vestibular disease. **DESIGN:** Retrospective chart review; prospective questionnaire. **SETTING:** A tertiary/quaternary care hospital clinic. **METHODS:** The charts of 28 patients who were treated for Meniere's disease were studied. Their responses to a pretreatment VVM questionnaire were scored and compared with their answers in a telephone follow-up to the same questions posttreatment. These questionnaires were compared with those filled in by 100 control patients without ear disease. **MAIN OUTCOME MEASURES:** Patients' responses to a VVM-specific questionnaire. **RESULTS:** Seventeen of 28 patients had VVM. Gentamicin therapy increased the number of positive answers. There was no correlation between the development of VVM complaints, caloric scores, and posturography performance. No control patients had symptoms of VVM. **CONCLUSION:** We conclude that the development of VVM indicates the onset or worsening of vestibular disease as it can be induced or exacerbated by gentamicin therapy. As there is no correlation between VVM and caloric scores, we suggest that otolithic damage may be responsible for this symptom set developing.

Olfactory neural cells: an untapped diagnostic and therapeutic resource. The 2000 Ogura Lecture. Perry, C., Mackay, S. A., Feron, F., McGrath, J. Department of Surgery, University of Queensland, Australia. cpmedical@hotmail.net.au. *The Laryngoscope* (2002) April, Vol. 112 (4), pp. 603–7.

OBJECTIVE: This is an overview of the cellular biology of upper nasal mucosal cells that have special characteristics that enable them to be used to diagnose and study congenital neurological diseases and to aid neural repair. **STUDY DESIGN:** After mapping the distribution of neural cells in the upper nose, the authors' investigations moved to the use of olfactory neurones to diagnose neurological diseases of development, especially schizophrenia. Olfactor-ensheathing glial cells (OEGs) from the cranial cavity promote axonal penetration of the central nervous system and aid spinal cord repair in rodents. The authors sought to isolate these cells from the more accessible upper nasal cavity in rats and in humans and prove they could likewise promote neural regeneration, making these cells suitable for human spinal repair investigations. **METHODS:** The schizophrenia-diagnosis aspect of the study entailed the biopsy of the olfactory areas of 10 schizophrenic patients and 10 control subjects. The tissue samples were sliced and grown in culture medium. The ease of cell attachment to fibronectin (artificial epithelial basement membrane), as well as the mitotic and apoptotic indices, was studied in the presence and absence of dopamine in those cell cultures. The neural repair part of the study entailed a harvesting and insertion of first rat olfactory lamina propria rich in OEGs between cut ends of the spinal cords and then later the microinjection of an OEG-rich suspension into rat spinal cords previously transected by open laminectomy. Further studies were done in which OEG insertion was performed up to one month after rat cord transection and also in monkeys. **RESULTS:** Schizophrenic patients' olfactory tissues do not easily attach to basement membrane compared with control subjects, adding evidence to the theory that cell wall anomalies are part of the schizophrenic 'lesion' of neurones. Schizophrenic patient cell cultures had higher mitotic and apoptotic indices compared with control subjects. The addition of dopamine altered these indices enough to allow accurate differentiation of schizophrenics from control patients, leading to, possibly for the first time, an early objective diagnosis of schizophrenia and possible assessment of preventive strategies. OEGs from the nose were shown to be as effective as those from the olfactory bulb in promoting axonal growth across transected spinal cords even when added one month after injury in the rat. These otherwise paraplegic rats grew motor and proprioceptive and fine touch fibers with corresponding behavioral improvement. **CONCLUSIONS:** The tissues of the olfactory mucosa are readily available to the otolaryngologist. Being surface cells, they must regenerate (called 'neurogenesis'). Biopsy of this area and amplification of cells in culture gives the scientist a 'window to the developing brain', including early diagnosis of schizophrenia. The 'Holy Grail' of neurological disease is the cure of traumatic paraplegia and OEGs from the nose promote that repair. The otolaryngologist may become the necessary partner of the

neurophysiologist and spinal surgeon to take the laboratory potential of paraplegic cure into the day-to-day realm of clinical reality.

Angled endoscopic laryngeal surgery: a new technique for diagnosis, surgery, and CO2 laser application. Morgado, P. F., Pontes, P. A. L. Surgical Research Laboratory, Larynx Institute, Universidade Federal de Sao Paulo, Brazil. pfmorgado@ig.com.br. *The Laryngoscope* (2002) June, Vol. 112 (6), pp. 1031–6.

OBJECTIVE: To present the development and application of a new technique to perform cold and laser laryngeal surgery. **STUDY DESIGN:** A prospective study of 11 patients submitted for endoscopic laryngeal surgery. **METHODS:** The technique used an endoscopic with a 45 degrees upward curve of its distal end; a set of angled instruments including an intraoral retractor, scissors, and forceps; and a surgical CO2 laser microtip. Eleven patients with laryngeal diseases and an indication for microsurgery underwent angled endoscopic laryngeal surgery successfully. Four patients underwent laser surgery. The CO2 laser was set between 0.5 and 2.0 W at normal exposure times and delivered distally through a lens composition within the angled handpiece. **RESULTS:** The lesions were precisely treated with minimal bleeding. The excised areas healed promptly, and no excessive scarring from laser application has been observed in a five-month postoperative video laryngoscopy follow-up. No major morbidity and no worsening of the voice occurred in any of the patients. A wide-angle view with a greater depth of field than the surgical microscope and a three-dimensional view were obtained as a result of the use of an endoscope in this technique; visualization of undersurfaces and an unobstructed visual field have been a result of the endoscope use as well. A beam waist ranging between 200 and 350 microm was produced. **CONCLUSIONS:** The approach described in the present study may help the laryngologist overcome some of the shortcomings and difficulties in laryngeal surgery, especially when dealing with patients in whom adverse anatomy and certain clinical conditions contraindicate microlaryngoscopy. Because of a delivery of laser waves at shorter distances from the lesions, a more precise tissue exeresis with minimal disturbances to the vocal folds might be accomplished as a result of the smaller beam waist produced. Distal delivery of laser waves also reduces the risks of stray laser beam striking nontargeted areas. Long-term studies with a larger number of patients are necessary.

High-precision measurement of the vocal fold length and vibratory amplitudes. Schuberth, S., Hoppe, U., Doellinger, M., Lohscheller, J., Eysholdt, U. Department of Phoniatrics and Pediatric Audiology, University of Erlangen Nuernberg, Erlangen, Germany. Stefan.Schuberth@gmx.de. *The Laryngoscope* (2002) June, Vol. 112 (6), pp. 1043–9.

OBJECTIVE/HYPOTHESIS: Standard laryngoscope suffers from a lack of information about the actual size of the observed objects (i.e. vocal fold length and oscillating amplitudes). However, there is much interest in absolute measures for both clinical and research purposes. Therefore, a laser projection device has been developed that enables the precise determination of absolute units in endoscopic investigation during respiration and phonation. **STUDY DESIGN:** An experimental study in which nine adults underwent high-speed endoscopy combined with a laser projection device. **METHODS:** The projection system consists of two parallel laser beams with a distance of 3.8 mm. It is mounted on the tip of a rigid endoscope, which is attached to a digital high-speed camera. During development and design, examination situations were taken into account. Two laser spots are projected onto the vocal folds and enable the definition of a metric scale within the endoscopic image. Knowledge-based image processing algorithms were used for evaluation. **RESULTS:** First measurements of the vocal fold length during phonation were performed in a group of nine healthy male students. The determination of glottal length during phonation agrees with former results. Quantifying vocal fold velocities in absolute units makes it possible to estimate the initial collision forces. **CONCLUSIONS:** The presented laser projection system allows the determination of absolute measures in the larynx. Because of the simple functional principle, the system is open for use without digital high-speed recording as well. Absolute units may also be helpful in voice diagnosis and in monitoring during voice therapy.