

Meniere's Research Findings – August 2018

T. Seo, et al. 2018. Recent and Frequent Vertigo Attacks Produce Negative Findings on Furosemide-Loading Vestibular Evoked Myogenic Potential Testing in Meniere's Disease. Objective: The peak-to-peak amplitude of the p13-n23 wave in cervical vestibular evoked myogenic potential can increase after furosemide administration in patients with Meniere's disease [furosemide-loading VEMP (FVEMP) testing]. The examination is used to test for the presence of endolymphatic hydrops; we investigated factors that may influence the results. Methods: Forty-two subjects (23 males and 19 females, aged 24-70 years) with unilateral definite Meniere's disease who underwent FVEMP testing were retrospectively studied. Possible factors associated with the results of FVEMP testing were studied using logistic regression analysis. Results: Ages, sex, affected side, stage, disease duration, and mean hearing level of pure tone audiometry did not influence the results of FVEMP testing in the univariate analysis ($p > 0.05$). Number of days since the last vertigo attack [odds ratio (OR): 1.07, $p = 0.031$] and frequency of vertigo attacks per month (OR: 0.42, $p = 0.003$) were significantly associated with the results of testing. Multivariate analysis showed that both days since the last vertigo attack < 7 (OR: 0.13, $p = 0.04$) and frequency of vertigo attacks per month ≥ 2 (OR: 0.06, $p = 0.004$) were risk factors for negative results on FVEMP testing. Conclusion: This study found that recent and frequent vertigo attacks produced negative findings on FVEMP testing in Meniere's disease. This apparently irrational finding can be explained by the consequences of membranous labyrinth rupture during vertigo attacks, where the altered saccular resonance due to EH cannot be recovered by furosemide administration because of the dissolving dehydration effect that occurs through communication between the endolymphatic and perilymphatic spaces. In addition, the impairment of sensory cells that is caused by endolymph and perilymph mixing upon rupture does not improve upon furosemide administration. FVEMP testing results may provide us with pathophysiological information regarding the membranous labyrinth.; *Frontiers in neurology*.9:636.

I. Saliba, et al. 2018. Endolymphatic duct blockage for refractory Meniere's disease: assessment of intraoperative CSF leak on short-term surgical outcomes. BACKGROUND: Endolymphatic sac decompression has shown limited success for the treatment of Meniere's disease (MD). We have published a novel technique with very promising results for the treatment of refractory MD: the Endolymphatic Duct Blockage (EDB) with two titanium clips. One of the challenges of this technique was an increased incidence of intraoperative Cerebrospinal Fluid (CSF) Leak. OBJECTIVE: To assess the effect of intraoperative CSF Leak on short-term surgical outcomes. METHODS: Retrospective comparative study in a tertiary care center (61 patients). MD patients who underwent EDB were included. Intraoperative CSF Leaks were documented. Surgical outcomes assessed were the presence of postoperative Benign Paroxysmal Positional Vertigo (BPPV), aural fullness, tinnitus, vertigo spells and pure tone average (PTA), speech discrimination scores (SDS) and bone conduction thresholds (BCT). Data were collected for these visits: preoperative, 1 week, 1 and 6 months postoperatively. RESULTS: Outcomes for the CSF Leak group (CSF +) ($n = 22$) were compared to remaining patient (CSF-)

(n = 39). There was no significant difference in the occurrence of postoperative BPPV, aural fullness, tinnitus and vertigo spells. There was no significant difference in PTA, BCT or SDS between our groups at any visit. **CONCLUSIONS:** Intraoperative CSF Leak may cause a temporary non-significant worsening of hearing in the first-month postoperatively without any difference at 6 months.; *Acta oto-laryngologica.1.*

R. Oya, et al. 2018. A high jugular bulb and poor development of perivestibular aqueductal air cells are not the cause of endolymphatic hydrops in patients with Meniere's disease. **OBJECTIVE:** The presence of endolymphatic hydrops in the inner ear, which can be detected with gadolinium-enhanced magnetic resonance imaging (Gd-MRI), is widely recognized as the main pathological cause of Meniere's disease (MD). However, the precise mechanisms underlying the development of endolymphatic hydrops remains unclear. One hypothesis proposes a relationship between the presence of a high jugular bulb (HJB) and MD, which disrupts the vestibular aqueduct leading to the development of endolymphatic hydrops. This study sought to identify anatomical features in MD patients using computed tomography (CT) images of the temporal bone. **METHODS:** Fifty-nine MD patients meeting the AAO-HNS diagnostic criteria and exhibiting endolymphatic hydrops in Gd-MRI were enrolled between July 2009 and December 2015. We only included MD patients who showed unilateral endolymphatic hydrops in Gd-MRI. Sixty-six patients with otosclerosis or facial palsy were also enrolled as control participants. In both groups, patients with other pathologies (e.g., chronic otitis media or cholesteatoma) and patients <16years old were excluded. HJB was defined as a JB that was observable in the axial CT image at the level where the round window could be visualized. JB surface area was measured on the axial image at the level where the foramen spinosum could be visualized. Finally, to investigate the relationship between the pneumatization of perivestibular aqueductal air cells and the existence of endolymphatic hydrops, the development of the air cells was rated using a three-grade evaluation system and the distance between the posterior semicircular canal (PSCC) and the posterior fossa dura was measured. **RESULTS:** The presence of HJB was observed in 22 of 59 affected sides of MD patients and in 17 healthy sides. The likelihood that HJB was detected on an affected side (22/39) was not significantly above chance (50%). The HJB detection rate did not significantly differ between the three groups (MD affected side, MD healthy side, and control patients). Furthermore, there were no significant group differences in JB surface area, distance between the PSCC and posterior fossa dura, or the development of perivestibular aqueductal air cells. **CONCLUSION:** We did not find any relationship between the anatomy of the temporal bones and the existence of endolymphatic hydrops. Moreover, we found no evidence suggesting that HJB or poor development of perivestibular aqueductal air cells were the cause of endolymphatic hydrops in MD patients.; *Auris, nasus, larynx.45(4):693.*

S. Nathan, et al. 2018. Low Concentration Intra-Tympanic Gentamicin Treatment for Meniere's Disease: A Long-Term Follow Up. **BACKGROUND:** Intra-tympanic injections of gentamicin (ITG), a known ototoxic agent, have been proven to be effective in controlling Meniere's disease (MD) symptoms, in

patients who did not respond to conservative therapy, although its safety was questionable. OBJECTIVES: To study whether low-concentration ITG, in refractory MD, had an effect on the ipsilateral hearing, in comparison to the contralateral ear, and to study the effectiveness of such treatment. METHODS: A comparative, retrospective cohort study was conducted between 2003 and 2015, and compared the change in the hearing level between the injected ear and the contralateral, untreated ear. OUTCOMES: In 20 of 27 patients (74.1%), one course of ITG treatment was considered as successful. In the short-term, there was improvement of hearing level at 1000 Hz ($p = 0.014$), and deterioration of hearing level at 8000 Hz ($p = 0.039$), both in comparison to the control ear. In the long-term and after confounders adjustment, we found there were no differences in the hearing levels between the treated ear and the untreated contralateral ear. CONCLUSIONS: A high success rates of treating vertigo attacks with low concentration ITG in refractory unilateral MD patients is herein reported, while a significant difference was not observed in the hearing threshold compared with the healthy contralateral ear.; *Otology & neurotology : official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology*.39(7):903.

A. L. Luryi, et al. 2018. Patient, disease, and outcome characteristics of benign paroxysmal positional vertigo with and without Meniere's disease.

BACKGROUND: Meniere's disease (MD)-associated benign paroxysmal positional vertigo (BPPV) is complex and difficult to diagnose, and reports of its prevalence, pathologic features and outcomes are sparse and conflicting. OBJECTIVE: Report disease characteristics and outcomes associated with the presence of MD in patients with BPPV. MATERIALS/METHODS: A retrospective study of patients with BPPV between 2007 and 2017 at a single, high-volume institution. RESULTS: Of 1581 patients with BPPV identified, 7.1% had MD and 71.9% of those patients had BPPV in the same ear(s) as MD. Patients with MD were more likely to have lateral semicircular canalithiasis (11.6% vs. 5.5%, $p = .009$) and multiple canalithiasis (7.1% vs. 2.5%, $p = .005$). MD was associated with an increased rate of resolution of BPPV ($p = .008$) but also increased time to resolution ($p = .007$). There was no association between MD and recurrence of BPPV. CONCLUSIONS: MD is associated with lateral canalithiasis. Contrary to prior reports, BPPV in MD can affect either ear and was not associated with poorer outcomes than idiopathic BPPV. SIGNIFICANCE: The largest series to date investigating disease and outcome characteristics for BPPV in MD is presented. These data inform diagnosis and expectations in the management of these complex patients.; *Acta oto-laryngologica*.1.

T. Kitahara, et al. 2018. Meniere's disease with unremitting floating sensation is associated with canal paresis, gravity-sensitive dysfunction, mental illness, and bilaterality. OBJECTIVE: The aim of the present study was to evaluate the association of neuro-otological examination, blood tests, and scoring questionnaire data with treatment-resistant intractability of persistent dizziness in Meniere's disease. METHODS: We managed 1520 successive vertigo/dizziness patients at the Vertigo/Dizziness Center in Nara Medical University from May 2014 to April 2018. Five hundred and twenty-two patients were diagnosed with Meniere's disease (522/1520; 34.3%) according to the

2015 diagnostic guideline of the International Classification of Vestibular Disorders. Among the patients with Meniere's disease there were 102 with intractable rotatory vertigo attacks for more than 3-6 months (102/522; 19.5%), including 20 bilateral cases (20/102; 19.6%), and 88 with intractable unremitting floating sensation rather than rotatory vertigo attacks for more than 3-6 months (88/522; 16.9%), including 28 bilateral cases (28/88; 31.8%). Sixty out of 88 cases with intractable unremitting floating sensation were unilateral and were enrolled for hospitalization to undergo neuro-otological examinations including pure-tone audiometry (PTA), the caloric test (C-test), vestibular evoked cervical myogenic potentials (cVEMP), subjective visual vertical (SVV) test, glycerol test (G-test), electrocochleogram (ECoG), inner ear magnetic resonance imaging (ieMRI), blood tests including anti-diuretic hormone (ADH) and bone alkaline phosphatase (BAP), and self-rating questionnaires of depression score (SDS). Data are presented as positive (+) ratios of the number of patients with examination and questionnaire data outside of the normal range. RESULTS: The ratios (+) were as follows: C-test=33.3% (20/60), cVEMP=25.0% (15/60), SVV=50.0% (30/60), G-test=55.0% (33/60), ECoG=63.3% (38/60), ieMRI=86.7% (52/60), ADH=35.0% (21/60), BAP=11.7% (7/60), and SDS=40.0% (24/60). Multivariate regression analysis revealed that the periods of persistent dizziness were significantly longer in unilateral Meniere's patients with C-test(+), SVV(+), and SDS(+) compared with those with negative findings. Additionally, the periods in bilateral cases were significantly longer than those in unilateral ones. CONCLUSIONS: Although approximately 70% of patients with Meniere's disease are usually treatable through the appropriate conservative medical therapy, the presence of canal paresis, gravity-sensitive dysfunction, neurosis/depression, and bilaterality may make the persistent dizziness intractable and may thus require additional treatments.; *Auris, nasus, larynx*.

E. R. Kirsh, et al. 2018. Sequential Imaging in Patient With Suspected Meniere's Disease Identifies Endolymphatic Sac Tumor. OBJECTIVE: The standard evaluation of patients with suspected Meniere's disease (MD) includes initial imaging to rule out tumors of the temporal bone. Few guidelines, however, advocate sequential imaging. We propose that sequential imaging may reveal other etiologies of auditory and vestibular symptoms as demonstrated in a patient with an endolymphatic sac tumor that was originally diagnosed Meniere's after initial imaging. PATIENTS: One patient with MD and initially unremarkable imaging. Repeat imaging several years after diagnosis after additional symptoms demonstrated interval development of an endolymphatic sac tumor (ELST). INTERVENTIONS: Resection of endolymphatic sac tumor. MAIN OUTCOME MEASURES: 1) Audiometry, 2) temporal bone imaging, and 3) otopathology RESULTS: A 45-year-old man with diagnosis of asymmetric sensorineural hearing loss and intermittent vertigo underwent temporal bone magnetic resonance imaging that did not demonstrate any causative lesions. After an episode of sudden sensorineural hearing loss 4 years after initial presentation, repeat imaging was obtained. Magnetic resonance imaging and surgical resection confirmed diagnosis of ELST. The patient had no history of von Hippel-Lindau disease. CONCLUSIONS: A patient with a longstanding diagnosis of MD demonstrated interval development of an ELST. While ELSTs are rare, the study raises the question regarding whether interval imaging is indicated in

patients with MD.; *Otology & neurotology : official publication of the American Otological Society, American Neurotology Society [and] European Academy of Otology and Neurotology.*

H. Jian, et al. 2018. Correlation between auditory-vestibular functions and estrogen levels in postmenopausal patients with Meniere's disease.

BACKGROUND: To investigate auditory and vestibular functions, estrogen levels, and its clinical correlation in postmenopausal females with Meniere's disease (MD). **METHODS:** We retrospectively analyzed the serum estradiol (E2) levels and the auditory and vestibular functions measured by auditory brainstem response (ABR) to high click rate, pure-tone audiometry (PTA), and caloric test on postmenopausal women who suffered from MD or not at the Specialist Clinic of Vertigo, Shandong Provincial Hospital, during September 2010 to October 2014. **RESULTS:** A total of 76 postmenopausal patients with MD and 50 healthy postmenopausal controls were included. The patients with MD had lower estrogen levels (22.50 +/- 16.66 pg/mL vs 30.69 +/- 18.59 pg/mL, P = 0.011), longer I-V interpeak latency of ABR (left 0.22 +/- 0.16 mseconds vs 0.18 +/- 0.10 mseconds, P = 0.118; right 0.24 +/- 0.13 mseconds vs 0.17 +/- 0.09 mseconds, P = 0.001), and higher unilateral weakness (UW) value (P < 0.001) in comparison with the controls. The mean pure-tone thresholds of at the speech frequency (500 Hz, 1 kHz, 2 kHz, and 3 kHz) were significantly elevated in patients with MD than those in the controls (left P < 0.001, right P < 0.01). The estradiol level of patients with MD was correlated with ABR latency (left r = -0.229, P < 0.05; right r = -0.220, P < 0.05) and UW value (r = -0.328, P < 0.05), but not with mean pure-tone threshold. **CONCLUSIONS:** Estrogen levels correlated with auditory and vestibular function in postmenopausal patients with MD. Low estrogen may be involved in the microcirculatory disturbance of the inner ear, affecting the occurrence and development of MD.; *Journal of clinical laboratory analysis.e22626.*

L. Caulley, et al. 2018. Autoimmune arthritis in Meniere's disease: A systematic review of the literature.

INTRODUCTION: Successful management of patients with Meniere's disease (MD) involves understanding the pathophysiology of the disease and its comorbidities. The role of autoimmune diseases (AD) in MD remains unclear. The aim of this study was to further investigate the association between MD and AD. Specific goals were to characterize the prevalence, distribution, clinical and laboratory findings, and outcomes of autoimmune arthritis (AA) in MD. **EVIDENCE REVIEW:** This systematic review was conducted according to PRISMA guidelines. Articles were identified through searches of MEDLINE, and EMBASE, as well as manual reviews of references, from 1947 to May 2017. We performed a systematic review of randomized-controlled trials (RCTs) and non-RCTs of cases of AA in MD. Due to the heterogeneity of the study methods and measures, a meta-analysis was not possible and a qualitative synthesis of the literature results was performed. The study protocol was registered with PROSPERO database (Trial Registration: CRD42017070516). **FINDINGS:** A total of 237 abstracts were identified and screened by two independent reviewers. Based on inclusion and exclusion criteria, nine studies were selected and subjected to a quality assessment. This quality control measure yielded eight studies for analysis in the

systematic review. The prevalence of AA was higher in MD (1.0-10.0%) as compared to the general population (0-1.1%), and noted to be higher in patients with familial MD as compared to sporadic MD (16.9% vs 4.5%, $p = 0.002$). There was no evidence to suggest a difference in immunologic profiles or selected treatment regimens. The most commonly reported AA in patients with MD was rheumatoid arthritis with a mean point prevalence of 4.3%. Many studies did not standardize their diagnostic criteria and did not measure clinically meaningful outcomes. CONCLUSIONS: There is a low level of evidence because of the lack of RCTs and original prospective studies. However, in this systematic review, we have identified the latest point prevalence data on AA in MD, indicating AA to be more prevalent within the MD population. RCTs treating MD as a local AD will enhance our understanding of the disease, and potentially change the way we manage MD.; *Seminars in arthritis and rheumatism*.48(1):141.