III. Vertigo Academy International

" VAI is a scientific commission of Politzer Society"

with the participation of

44th Neurootological and Equilibriometric Society Congress

PROGRAM

and

ABSTRACT BOOK

III. Vertigo Academy International

March 2-4, 2017

Grand Hyatt Mumbai Hotel

MUMBAI, INDIA

www.vainternational.org

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Dear Colleagues,

Vertigo Academy International, as the scientific sub organization of Politzer Society (The International Society for Otologic Surgery and Science), is one of the leading associations in the World for vestibular medicine.

Following the two previous meetings in Antalya, Turkey and Moscow, Russia, the Scientific Committee decided to organize the third in Mumbai. This is one of the most important locations in the World not only with its unique features but also its exotic, extravagant and elegant atmosphere. The scientific impact of the meeting will be significant as very prominent scientists on the topic arrive from several countries around the World as contributors to the meeting. The meeting will also serve for the physicians of the hosting country to participate and inspire effectively the latest progress on the topic.

The 44th Meeting of the Neuro-Otological and Equilibriometric Society (NES) is participating jointly with VAI-3. This collaboration will certainly give the Scientific Program of the meeting a nice perspective.

We have done our best to prepare this exceptional scientific program and we are grateful for the distinguished scientists of the topic who are contributing to the meeting.

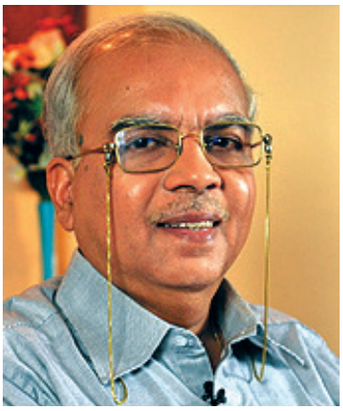
As is well known, instructional courses are organized to allow participants to meet the professors the day before the meeting begins. Further on the scientific sessions are being displayed within three parallel rooms.

I would like to thank the meeting co-chairs, Mohan Kameswaran and Anirban Biswas, and the Scientific Secretary, Onur Çelik, for all their efforts during the planning of this meeting. Their valuable insights into the field have enriched the scientific program and will make for a very stimulating meeting. I am grateful for their support and companionship.

Prof. Dr. O. Nuri Ozgirgin

Chairman

On behalf of Organization and Scientific Committees and Politzer Society
Vertigo Academy International



To all members of the Neurotological family,

It gives me immense pleasure to welcome the who's who and the stalwarts in NEUROTOLOGY as well as all the budding neurotologists from all parts of the world to INDIA. India is blessed by your esteemed presence and I feel greatly honored. On behalf of all my Indian colleagues I am pleased to welcome all of you all to the Conference.

Building on the success of the two previous Vertigo Academy International meetings and the forty three previous neurotology congresses organised by the Neurotological and Equilibriometric Society we have organised this joint meeting of two of the most prestigious neurotological academic bodies in the world today. The event is managed by SERENAS of Turkey one of the best known event managers worldwide. You are ensured of a great academic and social feast here.

This event aims to provide participants working in neurotology the latest cutting-edge knowledge on contemporary neurotology and the opportunity to sharpen their skills in diagnostic and therapeutic neurotology as it stands today. This abstract book is a chronicle of contemporary neurotology. Neurotology now is not an occult science that it used to be even a couple of decades back and today it is a completely evidence based medical discipline. Brainstorming academic events like this have brought NEUROTOLOGY to where it is today. The accolades for that should go to Prof C F Claussen (Hony President of NES) and Prof Nuri Ozgirgin (President of VAI) the two great souls who have nurtured the two academic bodies in neurotology and brought it to its present status.

We truly value the participation and support of all delegates attending the conference and for making it successful. Thank you so much for coming. Thank you!

Dr. Anirban Biswas

Vice-President International Neurotological and Equilibriometric Society

Co-Chairperson 3rd VAI and 44th NES joint congress

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Registration Desk

The registration desk is located in the Ballroom Lobby (lower level) of the Grand Hyatt Mumbai.

Registration Desk Opening Hours

March 2nd, 2017	08:00-20:00
March 3rd, 2017	08:00-18:30
March 4th, 2017	08:00-18:30

Accommodation Desk

The congress accommodation desk will be located on the Ballroom Entry Level in Grand Hyatt Mumbai Hotel.

Language

The official language of the congress and correspondence is English. There will not be any simultaneous translation during the congress.

CME Accreditation

The 3rd Vertigo Academy International / 44th Neurootological and Equilibriometric Society Congress is accredited by the European Accreditation Council for Continuing Medical Education (EACCME) to provide the following CME activity for medical specialists. The EACCME is an institution of the European Union of Medical Specialists (UEMS), www.uems.net.

The 3rd Vertigo Academy International / 44th Neurootological and Equilibriometric Society Congress is designated for a maximum of 15 hours of European external CME credits. Each medical specialist should claim only those hours of credit that he/she actually spent in the educational activity.

Through an agreement between the European Union of Medical Specialists and the American Medical Association, physicians may convert EACCME credits to an equivalent number of AMA PRA Category 1 Credits™. Information on the process to convert EACCME credit to AMA credit can be found at www.ama-assn.org/go/internationalcme.

Live educational activities, occurring outside of Canada, recognized by the UEMS-EACCME for ECMEC credits are deemed to be Accredited Group Learning Activities (Section 1) as defined by the Maintenance of Certification Program of The Royal College of Physicians and Surgeons of Canada.

Certificates

Certificates of Attendance will be available at the Congress Registration Desk.

CME Certificates will be available in the Ballroom Lobby area. To receive your CME Certificate, please first complete the questionnaire on the laptop provided. Your certificate will be printed upon completion of the questionnaire.

Name Badges

Please wear your name badges at all times during the congress. Badges are color coded as follows:

Faculty	**Red**
Participant	**Dark Blue**
Staff	**Orange**

Slide Check

Presenters are asked to kindly check their presentations at the slide check station located at the back of the Main Hall (Grand Ballroom II-III)

Posters

Posters will be displayed in the exhibition area - Grand Ballroom and Grand Salon Pre-function areas. Poster presenters are asked to mount their posters upon arrival, and to stand by their posters during presentation times.

Poster mount date & time:	March 2nd, 2017	at 13:00
Poster removal date & time:	March 4th, 2017	at 18:30

March 2nd, 2017			
	Grand Salon I-II	Grand Salon III	Mahogany
13:00-14:00		**Instructional Course** VEMPs	**Instructional Course** Computerized dynamic visual acuity in vestibular disorders
14:00-15:00	**Instructional Course** Localization of site of vestibular pathology - the vestibular gram– A new way of approaching vestibular diagnosis and management	**Instructional Course** Vestibular compensation	
15:00-15:30	Coffee Break		
15:30-16:30	**Instructional Course** Dizziness in the elderly	**Instructional Course** Superior Semicircular Canal Dehiscence	**Instructional Course** Vestibular Rehabilitation
16:30-17:30	**Instructional Course** Hydropic Ear Disease: Menière and friends	**Instructional Course** Electrocochleographic demonstration of the effect of pressure treatment on endolymphatic hydrops	
	Grand Salon I	Grand Salon II	Grand Salon III
19:00-22:00	**Meet the Expert Session with Dinner** Prof. Nuri Özgirgin (Max 15 pax)	**Meet the Expert Session with Dinner** Prof. Michel Lacour (Max 15 pax)	**Meet the Expert Session with Dinner** Prof. Michael Strupp (Max 15 pax)

March 3rd, 2017				
	Grand Ballroom II-III	Grand Ballroom I	Grand Salon I-II-III	Mahogany
08:00-09:00	**How I Do It 1** Cochlear implants and Meniere's disease		**How I Do It 3** A model for fellowship training program in vestibular sciences and disorders	
09:00-10:30	**Plenary 1** New tools of vestibular diagnosis: How they contribute			
10:30-11:00	Coffee Break			
11:00-13:00	**VAI Invited Lecture 1** Bilateral Meniere's Disease: Is it autoimmune? **VAI Round Table 1** Vestibular consequences of CI.	**VAI Invited Lecture 2** Implantable vestibular prostheses **Debate 1** Small Vestibular VS – Treatment Modalities	**Short Reports**	**Free Paper Oral Presentations**
13:00-14:00	Lunch Break			
14:00-15:30	**VAI Round Table 2** Chronic recurrent vestibulopathy	**Debate 2** Cervicogenic dizziness: Fact or Fiction?	**NES Invited Lecture 1** **NES Invited Lecture 2**	**VAI Round Table 5** A resume of EAONO Working Group of Consensus Studies on Vertigo
15:30-16:00	Coffee Break			
16:00-17:00	**VAI Invited Lecture 3** Perspectives in pharmacotherapy of vestibular disorders **VAI Invited Lecture 4** A resume for EAONO Guidline Studies on Vertigo	**VAI Invited Lecture 5** Principles of electrical stimulation in bilateral vestibular dysfunction **VAI Invited Lecture 6** Vestibular consequences of ABI	**Short Reports**	
17:00-18:30	**Plenary 2** Modern management of Meniere's disease			
19:30-20:00	**Opening Ceremony Speeches**			
20:00	**Opening Ceremony Dinner**			

March 4th, 2017				
	Grand Salon II-III	Grand Salon I	Grand Salon I-II-III	Mahogany
08:00-09:00	**How I Do It 4** Cochlear implants and Meniere's disease	**How I Do It 5** BPPV Treatment	**How I Do It 6** Vestibular neurectomy	**How I Do It 8** Immunotherapy for Vestibular Disorders
09:00-10:30	**Plenary 3** Vestibular rehabilitation			
10:30-11:00	Coffee Break			
11:00-13:00	**VAI Invited Lecture 7** Vestibular prehabilitation – When and why **VAI Round Table 3** BPPV Is there a consensus on its treatment?	**VAI Invited Lecture 8** An update on vestibular rehabilitation **Debate 3** Comorbidities in Meniere's disease		**Free Paper Oral Presentations**
13:00-14:00	Lunch Break			
14:00-15:30	**VAI Round Table 4** Vestibular Migraine	**Debate 4** Perilymph Fistula	**NES Invited Lecture 3** **NES Invited Lecture 4**	
15:30-16:00	Coffee Break			
16:00-17:00	**VAI Invited Lecture 9** Imaging of inner ear and the role of endolymphatic hydrops in assessing Meniere's disease **VAI Invited Lecture 10** Viral aetiology of Meniere's disease and the lack of an immune response in sufferers	**VAI Invited Lecture 11** A new theory for Meniere's disease: Detached saccular otoconia	**Short Reports**	
17:00-18:30	**Plenary 2** Drug Perfusion to the inner ear			

March 2nd, 2017

Grand Salon I-II

14:00-15:00 **Instructional Course**

• Localization of site of vestibular pathology - the vestibular gram – A new way of approaching vestibular diagnosis and management
Soumit Dasgupta

15:30-16:30 **Instructional Course**

• Dizziness in the elderly
Achal Gulati

16:30-17:30 **Instructional Course**

• Hydropic Ear Disease: Menière and friends
Robert Gurkov

Grand Salon III

13:00-14:00 **Instructional Course**

• VEMPs
Anne-Sophie Vinck

14:00-15:00 **Instructional Course**

• Vestibular compensation
Michel Lacour

15:00-15:30 Coffee Break

15:30-16:30 **Instructional Course**

• Superior Semicircular Canal Dehiscence: Third Window Syndrome
P. Ashley Wackym

16:30-17:30 **Instructional Course**

• Electrocochleographic demonstration of the effect of pressure treatment on endolymphatic hydrops
Maurizio Barbara

Grand Salon Mahogany

13:00-14:00 **Instructional Course**

• Computerized dynamic visual acuity in vestibular disorders
Anirban Biswas

15:30-16:30 **Instructional Course**

• Vestibular Rehabilitation
Nuri Ozgirgin

March 3rd, 2017

Grand Ballroom II-III (Main Hall)

08:00-09:00 **Cochlear Implants in Meniere's disease**

Angel Ramos

09:00-10:30 **Plenary Session**

• New tools of vestibular diagnosis: How they contribute
Chair: *Alok Majumder*
Moderator: *Toshihisa Murofushi*
Panelists: *Soumit Dasgupta, F. Necdet Ardic, Kamran Barin, Robert Gurkov*

10:30-11:00 Coffee Break

11:00-13:00 **Chair:** *Deepak Arjundas*

VAI Invited Lecture

• Bilateral Meniere's Disease: Is it autoimmune?
Speaker: *Antonio Lopez Escamez*

VAI Round Table

• Vestibular consequences of CI.
Moderator: *William Gibson*
Panelists: *Armağan İncesulu, Marc Bassim, Carlos Cenjor, Constantino Morera*

13:00-14:00 Lunch

14:00-15:30 **VAI Round Table**

• Chronic recurrent vestibulopathy
Chair: *Sinasi Yalcin*
Moderator: *Nuri Ozgirgin*
Panelists: *Saba Battelino, Badr el Mostafa, Nazim Korkut, Ronen Perez, Susan L Whitney*

15:30-16:00 Coffee Break

16:00-17:00 **Chair:** *Renuka Bradoo*

VAI Invited Lecture

• Perspectives in pharmacotherapy of vestibular disorders
Speaker: *Michael Strupp*

VAI Invited Lecture

• A resume for EAONO Guidline Studies on Vertigo
Speaker: *Jacques Magnan*

March 3rd, 2017

17:00-18:30 **Plenary**

• Modern management of Meniere's disease
Chair: *Orhan Yilmaz*

Moderator: *Maurizio Barbara*

Panelists: *Sergey Lilenko, Levent Ozluoglu, Anirban Biswas, KP Morwani, Antonio Lopez Escamez*

Grand Ballroom I

11:00-13:00 **Chair:** *Bhavana Sharma*

VAI Invited Lecture

• Implantable vestibular prostheses
Speaker: *Herman Kingma*

VAI Debate

• Small Vestibular VS – Treatment Modalities
Moderator: *Ilmari Pyykko*

Arguers: *Arnaud Deveze - Francois Caces - Robert Gurkov*

13:00-14:00 Lunch

14:00-15:30 **VAI Debate**

• Cervicogenic dizziness: Fact or Fiction?
Moderator: *Mete Kiroglu*

Arguers: *Ibrahim Hizalan - Mans Magnusson - Kamran Barin*

15:30-16:00 Coffee Break

16:00-17:00 **Chair:** *Ashim Desai*

VAI Invited Lecture

• Principles of electrical stimulation in bilateral vestibular dysfunction
Speaker: *Angel Ramos*

VAI Invited Lecture

• Vestibular consequences of ABI
Speaker: *Mohan Kameswaran*

Grand Salon I-II-III

08:00-09:00 **How I Do It**

• A model for fellowship training program in vestibular sciences and disorders
Radhika Aravamudhan, Girija Sundar

10:30-11:00 Coffee Break

11:00-13:00 **Short Reports**

Chair: *Bhaskar Ghosh*

1. *Tejaswini Patel* - Vestibular Profile In Patients With Auditory Neuropathy Spectrum Disorder
2. *Alice Huarte – Cochlear Implantation in Meniere disease patients.*
3. *Soumit Dasgupta* - Vestibular quantification in dilated vestibular aqueducts
4. *Toshihisa Murofushi* - Does intermittent pressure therapy using TMM device reduce endolymphatic hydrops in Meniere's disease? Study by cVEMP tuning property test
5. *Jeremy Hornibrook* - What are the true symptoms of chronic perilymph fistula?

13:00-14:00 Lunch

14:00-15:30 **Chair:** *Kalpesh Patel*

NES Invited Lecture

Speaker: *Michael Kersebaum*

15:30-16:00 Coffee Break

16:00-17:00 **Short Reports**

Chair: *Dwarkanath Reddy*

6. *Mohan Kameswaran* - Launch of Indian Vertigo Registry and KAP study
7. *Ilmari Pyykko* - Attacks unconsciousness in connection with Tumarkin attack
8. *Ashok Panagharia* - Balance dysfunctions in Parkinsonism and other extrapyramidal disorders

March 3rd, 2017

Mahogany

11:00-13:00 **Free Paper Oral Presentations**

Chair: *Rajesh Kumar*

1. *Agnes Szirmai* - Electronystagmographic results in BPPV
2. *Maurizio Barbara* - Role of video HIT in different otoneurological pathologies
3. *Agnes Szirmai* - Can quantitative head impulse, oculomotor and pure tone audiometry test (HINTS+) differentiate central from peripheral causes of acute vertigo?
4. *Stefani Maihoub* - Ultrasound-computer-craniocorpography results in BPPV
5. *Fazil Necdet Ardic* - Efficacy of vestibular rehabilitation programs in unilateral vestibular weakness
6. *Badr Eldin Mostafa* - The evaluation of vestibular function in patients with chronic suppurative otitis media
7. *Faiz Anwar* - VOR gain in patients with endolymphatic hydrops

13:00-14:00 Lunch

14:00-15:30 **VAI Round Table**

• A resume of EAONO Working Group of Consensus Studies on Vertigo
Chair: *A. V. Ramesh*

Moderator: *Jacques Magnan*

Panelists: *Marco Mandala, Enis Alpin Guneri, Michel Lacour, Soumit Dasgupta, Antonio Lopez Escamez*

March 4th, 2017

Grand Ballroom II-III (Main Hall)

08:00-09:00 **How I Do It**

• Immunotherapy for Vestibular Disorders
Nash Patil and Phoebe Roche

09:00-10:30 **Plenary Session**

• Vestibular Rehabilitation
Chair: *Ashok Pangarhia*

Moderator: *Susan L. Whitney*

Panelists: *Antonio Lopez Escamez, Michel Lacour, Nuri Ozgirgin, Maxim Zamergrad*

10:30-11:00 Coffee Break

11:00-13:00 **Chair:** *Dwarkanath Reddy*

VAI Invited Lecture

• Vestibular prehabilitation – When and why
Speaker: *Mans Magnusson*

VAI Round Table

• BPPV Is there a consensus on its treatment?
Moderator: *Enis Alpin Guneri*

Panelists: *Ludmila Antonenko, Mohamed Fawzy, Thomas Richard-Vitton, Avi Shupak, Marco Mandala*

13:00-14:00 Lunch

14:00-15:30 **VAI Round Table**

• Vestibular migraine
Chair: *Sabari Girish*

Moderator: *Nese Celebisoy*

Panelists: *Roberto Teggi, V. Ram Tarak Nath, Anirban Biswas*

15:30-16:00 Coffee Break

16:00-17:00 **Chair :** *MD Venkatesh*

VAI Invited Lecture

• Imaging of inner ear and the role of endolymphatic hydrops in assessing Meniere's disease
Speaker: *Ilmari Pyykko*

VAI Invited Lecture

• Viral aetiology of Meniere's disease and the lack of an immune response in sufferers
Speaker: *William Gibson*

March 4th, 2017

17:00-18:30 **Plenary**

• Drug Perfusion to the inner ear
Chair: *Mehmet Ada*
Moderator: *Tayfun Kirazli*
Panelists: *Ossama Hamid, Manuel Manrique, Onur Celik, Chunfu Dai, Satya Murali*

Grand Ballroom I

08:00-09:00 **How I Do It**

• BPPV Treatment
Thomas Richard Vitton

10:30-11:00 Coffee Break

11:00-13:00 **Chair :** *Dilip Raghavan*

VAI Invited Lecture

• An update on vestibular rehabilitation
Speaker: *Susan Whitney*

Debate

• Comorbidities in Meniere's disease
Moderator: *Milind Kirtane*
Arguers: *Uma Petnaik - Levent Ozluoglu - Antonio Lopez Escamez*

13:00-14:00 Lunch

14:00-15:30 **VAI Debate**

• Perilymph Fistula
Chair: *Himanshu Swami*
Moderator: *Leonardo Manzari*
Arguers: *Avi Shupak - Jeremy Hornibrook - Arnaud Deveze - Marco Mandala*

15:30-16:00 Coffee Break

16:00-17:00 **Chair:** *Mehmet Koyuncu*

VAI Invited Lecture

• A new theory for Meniere's disease: Detached saccular otoconia
Speaker: *Jeremy Hornibrook*

Grand Salon I-II-III

08:00-09:00 **How I Do It**

• Vestibular neurectomy
Jacques Magnan

10:30-11:00 Coffee Break

13:00-14:00 Lunch

14:00-15:30 **Chair:** *Satish Chandra*

NES Invited Lecture

Speaker: *Hideaki Sakata*

NES Invited Lecture 2

Speaker: *Konstantin Trinus*

15:30-16:00 Coffee Break

16:00-17:00 **Short Reports**

Chair: *Bhaskar Ghosh*

9. *Suwicha Isaradisaikul Kaewsiri* - Comparison of Treatment Outcomes of Posterior Canal Benign Paroxysmal Positional Vertigo between Single and Multiple Cycles of Canalith Repositioning Procedure: a Preliminary Study
10. *Jeremy Hornibrook* - Tone burst electrocohleography

Mahogany

08:00-09:00 **How I Do It**

• Immunotherapy for Vestibular Disorders
Nash Patil and Phoebe Roche

11:00-13:00 **Free Paper Oral Presentations**

Chair: *Lakshmi Narshiman*

11. *Jeremy Hornibrook* - Julius Ewald--The Man and His Famous Book
12. *Mario Milkov* - Diagnostic role of video head impulse test in adult patients with vestibular disorders
13. *Junichi Matsushima* - Conservative Therapy for Tinnitus Which May Have Originated from Neurovascular Compression in 523 Patients
14. *Surajit Barman* - An objective analysis of VHIT in comparison to ENG for evaluation of vestibular system
15. *Sandeep Kumar* - Bppv- Where We Stand
16. *Pushkar Kasat* - Our encounters with Spontaneous Mal de Debarquement Syndrome in a Neurotology Clinic at Kolkata
17. *Chetana Naik* - Vestibular dysfunction in Type-II Diabetes Mellitus
18. *Anita Bhandari* - Subjective Visual Vertical : findings of 500 Vertigo patients

FACULTY ABSTRACTS

March 2nd - Grand Salon I-II

14:00-15:00

LOCALISATION OF SITE OF VESTIBULAR PATHOLOGY - THE VESTIBULAR GRAM– A NEW WAY OF APPROACHING VESTIBULAR DIAGNOSIS AND MANAGEMENT

Dr Soumit Dasgupta
Consultant Neurotologist/Audiovestibular Physician
Alder Hey Children's NHS Foundation Trust, Liverpool, UK
Sheffield Vertigo and Balance Center, Sheffield, UK
Claremont Private Hospitals, Sheffield, UK
Hony. Lecturer/Tutor, Audiology and Deafness, University of Manchester, UK

Vestibular diagnosis is going through exciting times. The idea about frequency specificity of the vestibular sensory epithelia is translated into the use of different tests to assess this tonotopicity and site of lesion if any. The vestibular system comprises of 3 semicircular canals for angular motion transduction and 2 gravitational sensors for translational motion transduction in addition to the vestibular nerves and its central connections. Clinical and laboratory tests are currently available to assess different frequency zones of the angular motion sensors, the gravitational sensors individually and the nerve and its central connections. Following a full assessment, a vestibular gram can be constructed which can be crucial for customized rehabilitation for the most favourable outcome. This instructional course discusses these tests and their significance for management of vestibular pathologies.

15:30-16:30

DIZZINESS IN ELDERLY

Achal Gulati

16:30-17:30

HYDROPIC EAR DISEASE: MENIÈRE AND FRIENDS

R. Gürkov

Background: Over 75 years ago, endolymphatic hydrops was discovered as the pathologic correlate of Menière's disease. However, this pathologic finding could be ascertained only in post-mortem histologic studies. Due to this diagnostic dilemma and the variable manifestation of the various audiovestibular symptoms, diagnostic classification systems based on clinical findings have been used hitherto. These systems were not able to provide a comprehensive and consistent classification of the various clinical sub-entities of Menière's disease and did not include the various secondary Menière syndromes.

Methods: A review of the literature of MR imaging of hydropic ear disease.

Results: Recent developments of high resolution MR imaging of the inner ear have now enabled us to visualize in-vivo endolymphatic hydrops in patients with suspected Menière's disease. The existing knowledge from temporal bone histologic studies and from the emerging evidence on imaging based evaluation of patients with suspected Menière's disease indicate that endolymphatic hydrops not only is responsible for the full-blown clinical triad of simultaneous attacks of auditory and vestibular dysfunction, but also for other clinical presentations such as "vestibular" and "cochlear Menière's disease".

Conclusion: As a consequence, we propose the terms "Primary Hydropic Ear Disease" "Secondary Hydropic Ear Disease" as a new terminology which is based on symptomatic and imaging characteristics of these clinical entities in order to clarify and simplify their diagnostic classification. This classification allows for the first time the comprehensive and logic differentiation of the various clinical Menière's syndromes and at the same time includes not only primary but also secondary forms of the common disorder. The Hydropic Ear Disease terminology is applicable with and without the availability of high-field MR tomography.

March 2nd - Grand Salon III

13:00-14:00

AN INSTRUCTIONAL COURSE ON VEMP

A-S Vinck MD, R. Kuhweide MD, B. Lerut MD, J. Dedeyne, M. Muylle, L. Bleyaert
Department of Otorhinolaryngology and Head and Neck Surgery; AZ Sint-Jan Bruges-Ostend, Belgium. anne-sophie.vinck@azsintjan.be

Vestibular-evoked myogenic potential (VEMP) is a technique to assess the vestibular function and more specific the otolith function. Two different types are described: cervical (collic) VEMP (c-VEMP) and ocular VEMP (o-VEMP). c-VEMP is initiated by vibrations at the level of the saccule and will be measured at the level of the sternocleidomastoid muscle. By performing a c-VEMP we will gain information about the saccule and thus the inferior vestibular nerve. o-VEMP's are measured at the level of the inferior oblique muscle and offer more information about the utricle. In this workshop we will mostly focus on c-VEMP as the debate is out on the clinical relevance of o-VEMP.

A c-VEMP is a saccule-mediated, short-latency reflex recorded from averaged sternocleidomastoid electromyography in response to intense auditory stimuli delivered via headphones or bone conduction. c-VEMP's were first described in 2001 by Colebatch and they are now being used by investigators worldwide. Characteristic changes observed with aging and in a variety of peripheral and central vestibulopathies have been observed and described. In the meantime additional methods of evoking a c-VEMP have been described and these enrich the original technique. Of all the techniques currently used, clicks are the most reproducible, symmetric, and technically easy to perform. Normal values for the thresholds, latencies, amplitudes and side-to-side differences have been defined.

When click or tone burst-evoked c-VEMPs are absent we have to rule out technical (inadequate stimulus intensity,

sternocleidomastoid activation) and physiologic causes (conductive hearing loss, age effect). An audiometry and tympanometry should be performed to elucidate conductive hearing loss before performing an air-conducted click-evoked c-VEMP. In these cases an alternate stimulus that bypasses the middle ear (like taps, bone vibration) should be used. Bone-conducted c-VEMPs are less lateralized than those evoked by clicks.

Click-evoked c-VEMPs are attenuated or absent in a proportion of patients with neuritis of the inferior vestibular nerve, herpes zoster oticus, late Ménière disease and vestibular schwannomas. Their amplitudes are increased and thresholds are pathologically lowered in superior semicircular canal dehiscence.

In conclusion we can state that c-VEMP is established as a clinical test of saccule and inferior vestibular nerve function and provides a clinically useful addition to existing vestibular function tests, which are currently biased toward the assessment of canal rather than otolith function.

14:00-15:00

VESTIBULAR COMPENSATION

Lacour Michel

UMR 7260 Aix-Marseille University/CNRS, Research Federation « Brain, Behaviour, Cognition », Centre de St Charles, 3 Place Victor Hugo – 13331 Marseille Cedex 03 (France)

The vestibular system contributes to a wide range of functions, from postural and oculomotor reflexes to spatial representation and cognition. In association with visual and somatosensory cues, the peripheral vestibular inputs provide an accurate three-dimensional representation of head and body motion in space which is used to control the vestibular reflexes and perceptions. Three main outputs from the secondary vestibular neurons located in the vestibular nuclei (VN) in the brainstem are involved in the vestibular functions: the vestibulo-spinal pathways controlling posture and balance, the vestibulo-ocular pathways implicated in gaze stabilization, and the vestibulo-cortical system involved in self and extra-personal perception, perception of verticality and spatial navigation.

A peripheral vestibular loss leads therefore to impairments of these vestibular pathways, inducing a vestibular syndrome made of postural, ocular motor and perceptive deficits. In addition, a neurovegetative syndrome (nausea, vomiting) is observed due to the close relationships between the VN and the neurovegetative centers in the brainstem. As a rule, the vestibular deficits are more or less compensated with time in a process known as "vestibular compensation".

Compensating the vestibular deficits

I have clearly demonstrated that the vestibular symptoms could be categorized into static and dynamic deficits. The static deficits are observed in totally stationary animals or humans, without moving head and/or body in space (spontaneous nystagmus, vertigo, head tilt) while the dynamic deficits are seen in patients when moving the head or during locomotion (missing vestibulo-ocular reflex [VOR], loss of head stabilization, spatial disorientation). Whereas there is a full compensation of the static deficits over time, the dynamic deficits are not, or poorly, compensated.

Our group has demonstrated that compensation of the static deficits was due to plastic events occurring in the VN and associated structures (inferior olive, cerebellum). These plastic changes are made of different reactive signatures (genetic, neurotrophic, structural, neurochemical, metabolic,...) which can be seen as the *brain orchestration* of different *neurobiological mechanisms*. It must be mentioned however that the mechanisms involved as well as the time course of recovery depend on the nature of the vestibular deafferentation, that is, total *versus* partial, sudden *versus* gradual. They depend therefore on *vestibular aetiology*. In patients with total and sudden unilateral vestibular loss, recovery from static vestibular impairment is achieved within 6 months to 1 year post-lesion. Pharmacotherapy can help to accelerate the recovery process.

There is limited to no recovery of the dynamic impairments. However, if the patient is reviewed after a few years, symptoms like oscillopsia and dizziness are no longer present. This is because the brain has elaborated new substitution processes and new strategies to cope with the dynamic imbalance. For instance, compensation of the missing VOR can be done by avoiding the retinal slip during head rotation (closing the eyes, blocking head on trunk), or by using saccades (covert saccades) in the direction of head rotation, that is, in opposite direction compared with the slow phase of the normally working VOR. *This brain orchestration of behavioural strategies depends on the patients themselves.* It constitutes an idiosyncratic vicariant process, differing from one patient to another, an important point to consider for vestibular rehabilitation (VR) therapy. Indeed, VR therapy must help the patients to use the most appropriated strategy and to eliminate those not adapted to day life activities.

15:30-16:30

THIRD WINDOW SYNDROME: SUPERIOR SEMICIRCULAR CANAL DEHISCENCE AND OTHER THIRD WINDOWS OF THE INNER EAR

P. Ashley Wackym, MD

Professor and Chair, Department of Otolaryngology – Head and Neck Surgery, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey USA

Objective: Superior semicircular canal dehiscence (SSCD) was first recognized in 1998; however, since that time there have been numerous clinical entities that have been identified that produce the same symptoms that will produce a third window syndrome (TWS). The site of the dehiscence can be seen in some of these TWS entities by computed tomography (CT positive [CT+]) and include: SSCD, posterior semicircular canal dehiscence, internal carotid artery-cochlea dehiscence, cochlea-facial nerve dehiscence, posterior semicircular canal-jugular bulb dehiscence and posttraumatic hypermobile stapes footplate. While the CT positive (CT+) SSCD first described by Minor et al. is well-recognized, we recently recognized that a CT negative (CT-) TWS with exactly the same clinical phenotype also exists. Moreover, after plugging of a CT+ SSCD a CT- TWS can occur in some of these postoperative patients. The clinical phenotype of TWS will be defined, the surgical management outlined, the literature reviewed and three research studies will be presented.

Videos of several cases will be included to highlight aspects of the phenotype and response to surgical management.

Study design: Three separate prospective patient series.

Setting: Tertiary referral center.

Patients: Patients with peripheral vestibular dysfunction due to gravitational receptor asymmetries also have cognitive dysfunction and assumed neurobehavioral sequelae. Three studies will be presented: 1) comparison of 6 CT+ SSCD TWS and 6 CT- TWS patients; 2) a longitudinal study of the cognitive dysfunction and recovery of 17 patients undergoing craniotomy for superior canal plugging of CT+ SSCD TWS, CT- TWS undergoing round window reinforcement (RWR), or both; and 3) a study to identify co-morbidities affecting surgical outcomes after surgical management of CT+ SSCD TWS, CT- TWS, or both in 12 outlier patients. Comprehensive evaluations by a neurotologist, a clinical psychologist and two neurologists and neuropsychology testing were used to identify these co-morbidities.

Results and Conclusions: Third window syndrome has a defined phenotype, but multiple locations for this third window. A systematic approach to these patients results in an accurate diagnosis so that appropriate surgical management can be undertaken. The migraine headaches, cognitive dysfunction and clinical symptoms typically resolve or become manageable; however, there are co-morbidities that may affect outcomes of surgical management and alternative treatment options are available for these outliers.

Key Words: Third window syndrome, superior semicircular canal dehiscence, cognitive dysfunction, co-morbidities, traumatic brain injury, migraine

16:30-17:30

ELECTROCOCHLEOGRAPHIC DEMONSTRATION OF THE EFFECT OF PRESSURE TREATMENT ON ENDOLYMPHATIC HYDROPS

Maurizio Barbara, Edoardo Covelli, Francesca Atturo, Maria Teresa Benincasa, Simonetta Monini

NESMOS Department, ENT Clinic, Sapienza University, Rome. Italy

Electrocochleography (ECochG) represents one of the objective diagnostic method for the assessment of endolymphatic hydrops. This test is routinely used for diagnosing hydrops-related inner ear pathologies, such as Ménière's disease, and to correlate its finding with the stage of the disease. At our Clinic, disabling Ménière's disease (MD) is usually treated by using low-pressure treatment as delivered by a portable device, i.e. Meniett (Medtronic). This is usually carried out before addressing the affected subjects to a surgical procedure (vestibular neurectomy). A randomized study was designed where the MD subjects received either a ventilation tube plus Meniett treatment (1 month) or ventilation tube alone. The ECochG was performed before either treatment and after 1, 3 and 6 months. All the subjects presented with a clear ECochG hydropic pattern (SP/AP ratio >0.5), supporting a similar condition before starting the treatment. One month of Meniett treatment enable the majority of the subject to impriove symptomatologically, although in some of them the hydropic ECochG pattern was still present. At the 3 and 6 month control, instead, the clinical improvement was matching the ECochG pattern, in terms of normalisation of SP/AP ratio. In the VT-only group, only a small percentage of subjects received relief from their symptomatology and all of them still presented with a hydropic ECochG pattern, also at 3 and 6 month control. From the present study it is possible to assume that Meniett device would influence the hydropic condition, and that this influence may in some subjects display with a delayed effect.

March 2nd - Mahogany

13:00-14:00

COMPUTERISED DYNAMIC VISUAL ACUITY (DVA) TEST

Dr Anirban Biswas, Kolkata, India

The clinical / bedside test for dynamic visual acuity has been in vogue for many years as a clinical test for evaluating the function of the vestibulo-ocular reflex (VOR) and as a quick bedside test to rule out peripheral vestibular lesions. However the test did not gain the confidence of clinicians as the ideal conditions for the test like the correct speed of head movement and the correct angle of the head could not be monitored and more often than not the test was incorrectly performed. Hence the results were erroneous and seldom tallied with clinical findings. However by utilising modern technology for monitoring the test process by the easily available electronic and computerised methods, the DVA test can be perfectly done and when accurately done it has a specificity and sensitivity of about 95% for diagnosing dysfunction of the VOR and identifying defects in the lateral canals.

The traditional clinical visual acuity test was done by first finding the visual acuity on a Snellen's eye chart with the head static and then again by vigorously moving the head side to side and asking the patient to read the lines in the Snellen's chart while the head is vigorously moving. The former is called static visual acuity (SVA) and the latter is called dynamic visual acuity (DVA). If a person has a perfectly normal VOR then the patient should be able 'to catch' and 'to hold' an object's image on the fovea (the most sensitive part of the retina in the eye) long enough to see detail and read the letters (called optotypes) on the Snellen's chart while the head is moving at a reasonably high speed. How well the subject can maintain visual acuity while moving the head depends on the excellence of the patient's vestibulo-ocular reflex (VOR). In a person with a normal VOR, the degradation of visual acuity on moving the head should not be by more than two lines. If the visual acuity degrades by more than two lines i.e., the difference between SVA and DVA is more than 2 lines on the Snellen's chart, then it is suggestive of a poor vestibulo-ocular reflex which is indicative of a peripheral vestibular lesion. However for the test to be effective some conditions need to be met viz. –

1) During the dynamic visual acuity, the head must be flexed and should be about 15-20degrees below the horizontal so that the lateral canals are in the horizontal plane. In DVA the VOR of complimentary sets of semi-circular canals are tested; hence the head movement has to be in the exact plane of the 2 complimentary semi-circular canals that is

tested; since we are testing the lateral semi-circular canals the head movement must be in the plane of the lateral canals; *this needs instrumental monitoring*

2) The speed of head movement during the dynamic visual acuity test should be above 12 0degrees / sec which is approx. a speed of 2 Hz so that the gaze stabilisation is actually achieved by the VOR and not by any other mechanism. At lesser speeds of head movement gaze stabilisation is done by other mechanisms like the smooth pursuit system (SPS) and not by the VOR. Hence perfect monitoring of the speed of head movement is mandatory to ensure that VOR (not SPS) is tested as to evaluate the functional status of the semi-circular canals we need to ascertain the functionality of the VOR and not the SPS; *this too needs instrumental monitoring*

The clinical DVA test is a good bedside test but has poor specificity / sensitivity / reliability and is hence inaccurate and fallacious as-

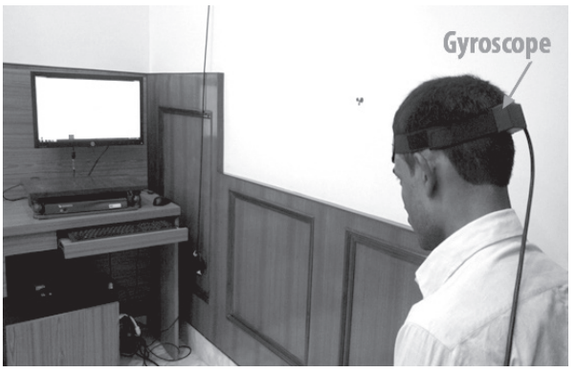
1) Accurate measurement of Visual acuity is not possible by Snellen's chart. To ascertain the precise degradation / change of visual acuity from static to dynamic if there be any, the documentation of visual acuity has to be perfect.

2) There is no check on whether the desired canal whose VOR we want to test is being stimulated or the VOR is being generated by a mix of partial contribution of different canals; this contaminates the test result and males the test inaccurate

3) There is no guarantee whether SPS or VOR is being tested, if SPS is being used for gaze stabilisation (i.e., if the speed of head movement is less than 2Hz) then no idea of semi-circular function is obtained from the test and hence the purpose of the test is completely lost.

All these problems are overcome by using a mechanised / computerised DVA

The evaluation of Visual acuity (VA) is much more accurate when the computerised logMAR system of testing visual acuity is used.as compared to that of the Snellen's chart. Documentation of results and analysis of difference of visual acuity between static & dynamic conditions is much better in the computerised system. In the mechanised version of the DVA testing system, a rate sensor (3 axis gyroscope) that can monitor the speed as well as the plane of the head movement is used.. If the lateral semicircular canals are being tested then the 3-axis gyroscope (a small device that can be attached to the ptient's head with a head band) monitors whether the head movement is occurring at a plane when the lateral semi-circular canals are in the exact horizontal plane i.e., the head is flexed at least 15-20 degrees. A software that runs the test system is so programed that it ensures that the letters (optoptpes) of the logMAR chart on the computer screen which the patient is supposed to read for the evaluation of visual acuity during the head movement (Dynamic VA) disappear if the head movement during dynamic VA test is below 1200/ sec or if the head is not in the correct plane i.e. the plane of the complimentary set of semi-circular canals being tested.



The DVA test as seen in the computer monitor

The special advantages of Instrumental/ computerised DVA test which is not there in the conventional or clinical DVA are:-

1)Very high specificity and sensitivity (approx.95%) in the computerised /mechanised DVA

2)Excellent intra-class correlation coefficients for inter-rater and test-retest reliability

3)Very dependable test to detect peripheral vestibular lesions; very small foot-print, portable hardware

Recent advancements:

DVA (even the computerised / mechanised version) test has traditionally been used for evaluating the functional status of the vestibulo-ocular reflex of both sides together and all the information available from the test was whether the VOR is normal or is poor; but whether the defect is bilateral or whether the semi-circular canal of the left or the right side individually or of both sides were involved could not be ascertained. However, in the updated current versions of the computerised DVA this is possible. Separation of data and hence evaluation of VOR for head movements in opposite directions i.e., on head movement to the left and that to the right which is required for side determination i.e., whether the semi-circular canal of left or right side or of both sides is defective is now possible. One of the limitations of the DVA test had been that the VOR functionality of the vertical canals (as is possible by the VHIT) was not possible but it is not impossible and some centres are trying to evaluate VOR of the vertical canals also by DVA and comparing the results with that of the more standardised VHIT. Nevertheless, this is still very much in the nascent stage and much more standardisation is required for evaluating the sensitivity of VOR of the vertical canals but it is possible and once this is achieved the scope of this very simple and inexpensive test will be much more enhanced. But even without the facility of testing the vertical canals, the current computerised / mechanised DVA is a very useful and reliable addition in the present-day neurotologist's diagnostic armamentarium.

14:00-15:00

VESTIBULAR REHABILITATION

M . Zamergrad, Russia

Vestibular rehabilitation is one of the most effective treatment strategies in patients with vestibular disorders. It is especially useful in unilateral peripheral vestibular insufficiency. However, vestibular rehabilitation technics are also important part of therapeutic program in bilateral peripheral vestibular pathologies, central vestibular lesions and even in functional dizziness.

The main goals of vestibular rehabilitation therapy are the following: reduction of instability and falls risk, improvement of gaze stabilization, reduction of dependency on visual and somatosensory inputs, decrease anxiety and somatization due to vestibular disorientation.

There are few main principles of vestibular rehabilitation that should be taken into account. First: vestibular rehabilitation has to be started as early as possible. It is crucial to begin it during first week of the disease as the delay of vestibular rehabilitation can negatively influence vestibular compensation. Second: sedative drugs (and vestibular suppressants among them) are able to slow down vestibular compensation; it is important to withdraw them as soon as possible (usually in the first two or three days). Third: repeated periods of retinal slip induce vestibular adaptation, so it is recommended to urge patient to keep eyes opened as long and as often as possible. Forth: cerebellum plays an important role in vestibular adaptation as it coordinates and regulates reorganization of vestibular nuclei in brainstem; disorders of cerebellum are able to retard vestibular adaptation and compensation in general.

The pre-treatment evaluation of patient with vestibular disorder consists of several questionnaires (DHI, Visual Vertigo Analog Scale), Motion Sensitivity Test, Time Up and Go test, Test of preferred and maximum gait speed.

There are a lot of vestibular rehabilitation exercises which can be assorted in several groups. The first group contains exercises for gaze stabilization (X1 and X2 viewing, active eye-head movements between two targets, remembered targets). The second group consists of exercises for static balance (Romberg feet together, Romberg turning head side to side, Modified sharpened Romberg, etc). The third group includes exercises for dynamic balance and ambulation (Ambulation with head turns in different planes and with different speed, Ambulation on treadmill or uneven surfaces or on ascend/descend ramp). The forth group contains habituation exercises. As a general rule these exercises can be selected according to the results of Motion sensitivity test.

In 2016 clinical practice guideline was published by American Physical Therapy Association Neurology Section. According to these guideline there are strong evidences that vestibular rehabilitation programs have to be offered for patients with unilateral or bilateral vestibular hypofunction and that voluntary saccadic or smooth-pursuit eye movements should not be performed in isolation (ie, without head movement) as exercises for gaze stability.

Novel vestibular rehabilitation techniques have been developed and proposed in last few years. Among them are rehabilitation technics based on Nintendo Wii Balance Board and Microsoft Kinect System. These technics are based on biofeedback principles and apparently are going to expand capabilities of vestibular rehabilitation.

March 3rd - Grand Ballroom II-III (Main Hall)

09:00-10:30

PLENARY - NEW TOOLS OF VESTIBULAR DIAGNOSIS: HOW THEY CONTRIBUTE

SUBJECTIVE VISUAL VERTICAL AND HORIZONTAL: CLINICAL VALUE

Prof. Fazıl Necdet Ardıç, MD
Pamukkale University School of Medicine, Denizli, Turkey

Otolithic organs have important contribution to balance function. The Subjective visual vertical(SVV)and horizontal(SVH) are useful tests for otolith function. Aim of this presentation is to present our experience on these tests and to discuss their limiitations.

Subjective visual vertical and subjective visual horizontal were measured in patients who had persistent or recurrent dizziness at least two months after acute period. Seventy-three patients and 18 controls were examined. Fifty-eight of the patients had peripheral; fifteen of them had central disease. lSVH and rSVH of peripheral group were significantly different than the control group ($p<0.01$). There was no difference in any test between peripheral and central group. These results showed that otolithic system had to be evaluated in chronic period of the dizziness especially in patients who frequently visit the physicians and modifications in treatment programs must be conducted.

CAN THE VIDEO HEAD IMPULSE TEST DEFINE SEVERITY OF BILATERAL VESTIBULAR HYPOFUNCTION?

Kamran Barin

Rotary chair testing is considered the gold standard for evaluation of bilateral vestibular hypofunction (BVH). However, rotary chair testing is not readily available in many clinical settings. The purpose of this study is to determine if video head impulse testing (vHIT) can be used as a screening test to identify the presence and severity of bilateral vestibular hypofunction. The results show that the average right-left lateral VOR gain in vHIT is highly correlated with the gain in rotary chair. Furthermore, lower average vHIT gains are consistent with more severe BVH.

NEW TOOLS OF VESTIBULAR DIAGNOSIS – HOW THEY CONTRIBUTE

Dr Soumit Dasgupta
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Claremont Private Hospitals, Sheffield, UK
Hony. Lecturer/Tutor, Audiology and Deafness, University of Manchester, UK

Vestibular diagnostic tools have evolved at an astonishing pace over the last 20 years. Whilst knowledge about the frequency specificity of the vestibular basement membrane gathers momentum, new tests are emerging to test this tonotopicity. The vestibular myogenic evoked potentials to test utriculosaccular function, the video head impulse test to test for high frequency 6 canal angular motion sensor function, software driven dynamic visual acuity, skew deviation, head shake, Hennebert's test and hyperventilation tests in addition to standard videonystagmography with and without optic fixation and the rotatory chair tests are important tools to identify vestibular function. Some other lesser well known tests like the head heave for utricular function, the ocular counter rolling for utriculo saccular function, gait measurement tests and measurement of the subjective visual vertical for gravitational sensor function add to the repertoire. We are living in exciting times and this presentation will discuss about the advantages and the pitfalls of these tests.

11:00-13:00

INVITED LECTURE - BILATERAL MENIERE'S DISEASE: IS IT AUTOIMMUNE?

BILATERAL MENIERE'S DISEASE: IS IT AUTOIMMUNE?

Jose A.Lopez-Escamez[1,2] and Lidia Frejo[1] on behalf of Meniere disease Consortium
[1]Otology & Neurotology Group CTS495, Department of Genomic Medicine- Centro de Genómica e Investigación Oncológica – Pfizer/Universidad de Granada/ Junta de Andalucía (GENYO), Granada, Spain
[2]Department of Otolaryngology, Instituto de Investigación Biosanitaria ibs.GRANADA, Complejo Hospitalario Universidad de Granada (CHUGRA) Granada, Spain

Meniere disease (MD) is a complex clinical condition characterized by sensorineural hearing loss, episodic vestibular symptoms and tinnitus associated with several comorbidities such as migraine or autoimmune disease (AD). The frequency of bilateral involvement may range from 5-50% and it depends on the duration of the disease. We have performed genomic and clinical studies in 398 patients with bilateral MD. Herein, we identified the first locus, at 6p21.33, suggesting an association with bilateral MD (lead signal rs4947296). This marker is found in 14% of patients with bilateral MD and in 17% of patients with MD and an associated autoimmune disorder and the carriers develop an NFκB-mediated inflammatory response. To decipher the complexity of bilateral MD, we conducted a cluster analysis in patients with bilateral MD by using clinical variables to identify the best predictors to define clinical subgroups. We have defined five clinical variants in bilateral MD. Group 1 is the most frequently found, includes 46% of patients, and is defined by metachronic hearing loss without migraine and without AD. Group 2 is found in 17% of patients, and it is defined by synchronic hearing loss without migraine or AD. Group 3, with 13% of patients, is characterized by familial MD, while group 4, that includes 12% of patients, is associated by the presence of migraine in all cases. Group 5 is autoimmune bilateral MD secondary to another AD and it is found in 11%.

Conclusions: A subset of 17% patients with bilateral MD is autoimmune and it can be diagnosed by genetic testing. These patients could be treated with NFκB inhibitors.

ROUND TABLE - VESTIBULAR CONSEQUENCES OF CI.

DIZZINESS AFTER COCHLEAR IMPLANTATION: MAKING SENSE OF THE TESTING CONFUSION

Marc Bassim, MD, FACS
American University of Beirut Medical Center

Impairment of vestibular function after cochlear implantation is an important element to consider in the decision-making process for surgery. This is particularly important in cases where bilateral cochlear implants are considered, or when the candidate is an elderly person with the potential for significant morbidity from the resultant imbalance.

The true incidence of vestibular impairment after implantation is not quite known, with even some studies reporting an improvement in overall balance function. Results using objective testing seem to overestimate the true incidence of impairment when compared to subjective patient reports through validated questionnaires. Similarly, the effect of cochlear implantation seems to differ depending on the testing modality being used to assess the vestibular system.

In this presentation, we will consider the different modalities used for assessing balance function after cochlear implantation, and attempt to correlate that to the presumed pathophysiology underlying vestibular impairment after surgery.

EVALUATION OF SEMISIRCULAR CANAL FUNCTION IN COCHLEAR IMPLANT PATIENTS

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In cases of severe to profound SNHL, cochlear implants are an effective method for hearing rehabilitation. Surgery of cochlear implantation is a well-established and safe procedure. The rate of the side effects and the complications are very low. One of the side effects is vestibular dysfunction and it has been reported between 25-74 % in the literature. Vestibular dysfunction after CI may due to main disorder that causes severe to profound hearing loss, insertion trauma, changes in fluid homeostasis of the inner ear,

delayed endolymphatic hydrops, inflammation in the labyrinth, leakage around the cochleostomy.

Assessment of vestibular system needs several tests in addition to detailed history and physical examination. Laboratory tests consists of videonistagmography including caloric test, evoked vestibular myogenic potentials, rotational chair, computerized dynamic posturography and video head impulse test (vHIT)

Bithermal caloric test and vHIT evaluate the semisircular canal functions. Caloric test is a test only for the lateral semicircular canals with a low frequency stimulation. vHIT use for all three semisircular canals and high frequency stimulation is used.

In this study, patients with unilateral cochlear implant were evaluated with office tests, bithermal test and video head impulse test. Results were compared with etiology, duration of cochlear implant use and subjective vertiginous symptoms which was evaluated dizziness handicap inventory.

Vertigo episodes were controlled with intratympanic treatment prior to CI or by concomitant laberinthectomy. They presented 18.8 ± 15.8 dizziness (lasting more than 20 minutes) in the 6 months prior to surgery. In 5 cases the vertigo was controlled with intratympanic treatment. 2 cases were operated by simultaneous laberinthectomy and cochlear implant.

Conclusions

- 2% of patients with bilateral MD reached a neurosensorial hearing loss susceptible to CI.
- The CI reach good auditory results in patients with MD.
- IC improves tinnitus.
- The CI does not modify the evolution of MD.

CLINICAL EVOLUTION OF PATIENTS WITH MENIERE'S DISEASE (MD) AFTER COCHLEAR IMPLANTATION

Constantino Morera , Claudio Krstulovic and Herminio Perez-Garrigues
University Hospital "la Fe". University de Valencia

Introduction

Meniere's disease (MD) causes progressive labyrinthine deterioration that can cause severe to profound hearing loss. In cases of bilateral MD with bilateral deafness the only possible treatment of hearing loss is the Cochlear Implant (CI).

Since this cases are is infrequent there are few data reported. In this study we reviewed our experience in this patients.

Material and Methods

The study is an prospective, observational and analytical one.

7 patients diagnosed with Bilateral Meniere's Disease and bilateral HNS candidates to cochlear implantation, were inludad. The mean age was 54 ± 12 years and the surgery was performed 15 ± 8 years from the beginning of the disease.

The IC was unilateral in all cases. 5 patients were implanted with Cochlear implant and 2 Med-el.

In 5 patients a conventional cochlear implantation was performed through mastoidectomy, posterior tympanotomy and cochleostomy. In 2 cases the new technique of laberinthectomy and CI was performed in the same surgery.

The audiological assessment was made using tonal tests. The intensity of tinnitus was performed using a visual analog scale from 0 to 10. The valuation of vertiginous episodes was made trough the characteristic of each vertigo episodes and its duration. A statistical analysis was performed using the T-student test for paired samples or the Wilcoxon Paired Rank Test

Results

The incidence of bilateral MD in our series is 20%. Of these, 7 patients (8.75%) were candidates for CI (1.75% of the total of MD patients in our series.

The hearing outcomes improve in the implanted ear in tonal thresholds from 115 ± 30 dB preoperatively to 30 ± 8 dB after implantation (p = 0.016). The verbal outcomes were good and concordant with the tonal results.

The intensity of tinnitus, assessed with a visual analogue scale, shown a significant decrease from an intensity of 7.5 ± 1.6 to 4.4 ± 3.3 (p = 0.033)]. 2 patients had total disappearance of tinnitus.

14:00-15:30

ROUND TABLE - CHRONIC RECURRENT VESTIBULOPATHY

CHRONIC RECURRENT VESTIBULOPATHY

Saba Battelino
University Medical Centre Ljubljana, Dept. of Otorhinolaryngolog, University of Ljubljana, Faculty of Medicine

Dizziness is prevalent in 5-10 % of the world population and is the seventh most frequent complaint for women and fourth most frequent in men. Almost half of the population over the age of 70 years is affected by dizziness. Of the many causes of dizzenes, bilateral and chronic or recurrent vestibulopathy is rare. The following are the most diagnosed causes for chronic or recurrent vestibular disorders: Meniere´s disease, vestibular migraine, vestibular paroxysm, vestibular drop attacks, phobic postural vertigo, periodic alternating nystagmus, paroxysmal dysarthria and ataxia in sclerosis multiplex, after syndrome Ramsay Hunt, NF2 neurofibromatosis, CANVAS (cerebellar ataxia with neuropathy and bilateral vestibular areflexia syndrome), autoimmune diseases of the inner ear, syndrome of down beating nystagmus, CABV (cerebellar ataxia and bilateral vestibulopathy) episodic ataxia type 2 and Cogan´s syndrome. Chronic vestibulopathy can be caused also by cerebral superficial siderosis (CSS), by aging or can occur as idiopathic latent vestibulopathy. Patient presentation of chronic recurrent vestibulopathy can be straight forward or complex. Even single occurrence vestibular can cause significant suffering for patients. Chronic recurrent vestibulopathy is very limiting disease for the patient. These patients typically presented with chronic unsteadiness with or without vertigo. It is often associated with bilateral or unilateral hearing loss, especially in patients with CSS and with cerebellopontine angle tumors. Physical exam can reveal gaze evoked nystagmus, positive head impulse test on one or both horizontal directions, impaired smooth pursuit and central positioning nystagmus. Psychogenic disorders also play an important role in a majority of patients who presents with complex dizziness. In the course of their disease about 70 % these patients are increasingly debilated in their professional life and daily activities. This may occur years after the first presentation of the organic forms of dizziness. The symptoms associated with chronic peripheral

vestibulopathy exert a negative impact on the independence and quality of life of these individuals. The most frequent underlying psychiatric disorders are anxiety and depressive as well as dissociative somatoforms disorders. The impact of dizziness of elderly individuals with chronic vestibular disorders is greater in patients with rotatory and non-rotatory dizziness, recurrent falls, neurovegetative symptoms, hypersensitivity to sounds and functional capacity disorder. In the elderly with recurrent falls, neurovegetative symptoms and functional capacity disorder have very strong negative effects on emotional wellbeing. Current medical literature has shown that improved postural balance is associated with functional capacity of subjects with chronic peripheral vestibular disorders. The numbers of drugs available for the management of patients with vestibular or nystagmus syndromes has increased considerably within last decade. Vestibular exercises, computer added dynamic posturography based exercises, psychological support and cognitive and behavioral therapy and/or psychiatric approaches may be significantly beneficial, especially in bilateral or chronic recurrent vestibulopathy. To vindicate which therapies are most efficacious randomized prospective placebo-controlled studies are needed. Additionally, optimal dose finding studies are needed to determine best therapy, for both acute relief of symptoms and for long-lasting remission. Vestibular exercises, specially dynamic and computerized will play an important role in rehabilitations of these patients.

CHRONIC RECURRENT VESTIBULOPATHY

Badr Eldin Mostafa
Ain-Shams University, Cairo EGYPT

Background: Chronic recurrent vestibulopathy is is a disease that displays recurrent symptoms of episodic vertigo lasting minutes to hours without auditory or neurologic signs or symptoms. Although first described in 1981 it was not an accepted diagnosis for many authors until recently.

Work: This is a review on chronic recurrent vestibulopathy outlining its clinical characteristics, differential diagnosis and possible diagnostic features. Although imprecise the disease can be distinguished from other causes of recurrent vertigo . However long term follow-up is mandatory. Genuine patients seem to recover over a period. However, a certain percentage may evolute to other more specific diagnoses such as MD or migraine.

Conclusion: CRV is a well-defined entity which should be borne in mind in patients with recurrent vestibular symptoms. Long term follow-up is mandatory to detect other specifically treatable entities.

CHRONIC RECURRENT VESTIBULOPATHY

O. Nuri Ozgirgin
Bayindir Hospital, Ankara, Turkey

Every known entity among vestibular disorders are very well documented and described. Many of them have additionally been defined in consensus.

When we go through these definitions it is possible to find out many cases that present themselves beyond the definitions of these vestibulopathies, especially when evaluated thoroughly by using advanced vestibular examination techniques.

I believe it is important to discover these cases in terms of treatment when they do not refer to any described vestibular entity.

Within this session the algorithms of chronic recurrent vestibulopathy will be discussed to delineate this entity.

RECURRENT VESTIBULOPATHY: NATURAL HISTORY AND TREATMENT

Ronen Perez and Jean Yves Sichel
Dept. of Otolaryngology and Head and Neck Surgery, Shaare Zedek Medical Center affiliated with the Hebrew University Medical School, Jerusalem, Israel.

Recurrent vestibulopathy (RV), first described by Leliever and Barber in 1981, is a clinical syndrome characterized by recurrent episodes of vertigo lasting minutes to hours without auditory or neurologic signs or symptoms. The vertigo is not caused by a change in head position and is similar to vertigo typical of Meniere's disease but without the auditory symptoms. Some authors raised the possibility that the diagnosis of RV is an "artificial diagnosis" and that the true diagnoses of these patients are migraine, a variant of Meniere's disease or even recurrent vestibular neurinitis. To date the etiology of this relatively common entity is unknown. Possible proposed pathophysiology's include endolymphatic hydrops, recurrent viral infection and vascular eighth nerve compression. Over the years we have followed up over 100 patients diagnosed as having RV in our center. Patients with two or more typical episodes were included, the female/male ratio was 2/1 and the mean age was 45. Upon diagnosis we recommended, in addition to follow up, a salt restriction diet. The overall prognosis was good (70% of patients were free of vertigo 5 years from the initial episode) and only a small percentage developed full Meniere's disease.

16:00-17:00

INVITED LECTURES

PHARMACOTHERAPY OF VERTIGO AND DIZZINESS

Michael Strupp, MD, FANA, FEAN
Department of Neurology and German Center for Vertigo and Balance Disorders
Michael.Strupp@med.uni-muenchen.de

For the pharmacotherapy of vertigo and dizziness there are basically eight groups of drugs that can be used (the "**8 'A's**"): antiemetics; anti-inflammatory, anti-menières, and anti-migraineous medications; anti-depressants, anti-convulsants, aminopyridines and acetyl-DL-leucine.

Peripheral vestibular disorders

Acute unilateral vestibulopathy. A prospective randomized placebo-controlled study (on 141 patients) showed that methylprednisolone alone significantly improves the recovery of

peripheral vestibular function in patients with vestibular neuritis, whereas valacyclovir does not.[1] These findings are supported by a recent trial.[2]

Menière's disease (MD). Although the BEMED trial[3] was negative the author is convinced that appropriate dosages of betahistine are effective in MD. This was shown in an observational study with dosage of up to 480 mg per day[4] and is supported by animal studies which show a dose-dependent increase of cochlear blood flow[5], mediated via H3 receptors[6] which are also found in the human inner ear[7].

Vestibular paroxysmia[8]. In an open trial it was demonstrated that carbamazepine in a dosage of 400 to 600 mg per day significantly reduces the number of attacks of vestibular paroxysmia[9].

Central vestibular, ocular and cerebellar disorders

Downbeat and upbeat nystagmus, episodic ataxia type 2 and other cerebellar disorders. Several trials showed that the potassium channel blockers 3,4-diaminopyridine and 4-aminopyridine are effective for the treatment of downbeat nystagmus and episodic ataxia type 2 (for references see[10]) and the modified amino acid acetyl-DL-leucine cerebellar ataxia.[11]

Perspectives

There are currently eight on-going placebo-controlled clinical trials at the German Center for Vertigo and Balance Disorders (all funded by the Federal Ministry Research (BMBF)) on the following vestibular and cerebellar disorder: BPPV (vitamin D), vestibular paroxysmia (carbamazepine), vestibular migraine (metoprolol), acute unilateral vestibulopathy (betahistine), episodic ataxia type 2 (Fampiridine and acetazolamide), cerebellar gait ataxia (Fampiridine) and cerebellar ataxia (acetyl-DL-leucine).

Reference List

1. Strupp M, Zingler VC, Arbusow V et al. Methylprednisolone, valacyclovir, or the combination for vestibular neuritis. N Engl J Med 2004;351(4):354-361.
2. Karlberg ML, Magnusson M. Treatment of acute vestibular neuronitis with glucocorticoids. Otol Neurotol 2011;32(7):1140-1143.
3. Adrion C, Fischer CS, Wagner J, Gurkov R, Mansmann U, Strupp M. Efficacy and safety of betahistine treatment in patients with Meniere's disease: primary results of a long term, multicentre, double blind, randomised, placebo controlled, dose defining trial (BEMED trial). BMJ 2016;352:h6816.
4. Lezius F, Adrion C, Mansmann U, Jahn K, Strupp M. High-dosage betahistine dihydrochloride between 288 and 480 mg/day in patients with severe Meniere's disease: a case series. Eur Arch Otorhinolaryngol 2011;268(8):1237-1240.
5. Ihler F, Bertlich M, Sharaf K, Strieth S, Strupp M, Canis M. Betahistine exerts a dose-dependent effect on cochlear stria vascularis blood flow in Guinea pigs in vivo. PLoS One 2012;7(6):e39086.
6. Bertlich M, Ihler F, Freytag S, Weiss BG, Strupp M, Canis M. Histaminergic H-Heteroreceptors as a Potential Mediator of Betahistine-Induced Increase in Cochlear Blood Flow. Audiol Neurootol 2015;20(5):283-293.
7. Moller MN, Kirkeby S, Vikesa J, Nielsen FC, Caye-Thomasen P. Expression of histamine receptors in the human endolymphatic sac: the molecular rationale for betahistine use in Menieres disease. Eur Arch Otorhinolaryngol 2015.
8. Strupp M, Lopez-Escamez JA, Kim JS et al. Vestibular paroxysmia: diagnostic criteria. J Vestib Res. (in press).
9. Hufner K, Barresi D, Glaser M et al. Vestibular paroxysmia: diagnostic features and medical treatment. Neurology 2008;71(13):1006-1014.
10. Strupp M, Kremmyda O, Brandt T. Pharmacotherapy of vestibular disorders and nystagmus. Semin Neurol 2013;33(3):286-296.
11. Strupp M, Teufel J, Habs M et al. Effects of acetyl-DL-leucine in patients with cerebellar ataxia: a case series. J Neurol 2013;260(10):2556-2561.

A RESUME FOR EAONO GUIDLINE STUDIES ON VERTIGO

Jacques Magnan

Recommendations in the diagnosis of Meniere' disease 5éà&è°

Characteristic clinical presentation (sudden rotatory vertigo with unilateral otologic symptoms) is the gold standard.
Evidence : 5 , Recommendation : A (consistant by definition), Agreement : strong

Recommendation in the assessment of meniere

First assessment : Audiometric tests (Vertigo with low frequency SNHL is suggestIve of Meniere)
Evidence : 1 , Recomendation : A consistant, Agreement : strong
Second line assement : Vestibular tests
Third line assessment : Imaging
Evidence : , Recommendation : , Agreement : strong

Recommendation in the treatment of Meniere

1. Attack of vertigo

Vestibular suppresants and anti-vertigo (vomiting) drugs
Evidence : Recommendation : A consistant, Agreement : strong

with steroid
Evidence : , Recommendation : D inconsistant, Agreement : weak

2. To prevent attack of vertigo

2-1 : First line medical treatment
Beta Histidine , 24mg Bid for 3 months is the standard treatment
Evidence : 2 , Recommendation : A , Agreement : strong

Diuretics & Salt restriction
Evidence 3, Recommendation : C , Agreement : weak

2-2 : Failure of medical treatment : Second line Intratympanic injections
Intratympanic gentamycin is the standard treatment
Evidence : 2, Recommendation : A consistant, Agreement : strong

Intratympanic dexamethasone more specific indications to preserve hearing (before or after gentamycin)
Evidence : 3, Recommendation : A, Agreement : strong

2-3 : Failure of Intratympanic injections : Third line surgical procedures
Evidence : 2 , Recommendation : A, Agreement : strong

Vestibular Neurotomy is the standard treatment regarding results
Labyrinthectomy is an alternative if poor or no hearing
Evidence :2 , Recommendation :A consistant, Agreement : strong

Endolymphatic sac shunt *Evidence : 5, Recommendation : D inconsistant, No Agreement*

17:00-18:30

PLENARY - MODERN MANAGEMENT OF MENIERE'S DISEASE

MENIERE'S DISEASE --DO DIURETICS HAVE A ROLE IN THERAPY TODAY?

Anirban Biswas
Kolkata, India

In the treatment of Meniere's disease diuretics have lost the pride of place that it once enjoyed. Diuretics appear to have fallen out of favour of most contemporary neurotologists when it comes to choosing a drug for Meniere's disease (MD), Betahistine is the first choice. However, in my clinical practice which is limited to Neurotology only I have had a very satisfactory experience with diuretics only in the management of Meniere's disease and did not have much reason to choose betahistine over diuretics in most patients of recurrent Meniere's disease. I am fully aware that this contradicts current consensus, and I am putting forward my views very hesitatingly more to clear my doubts and to be clarified on any irrationality that I may be having in my logic. This is one of the highest academic forums in Neurotology today and I would like to have my doubts cleared even if it stirs a hornet's nest.

The logic in favour of BETAHISTINE in confirmed Meniere's disease did not appear very convincing to me in spite of all the scientific propaganda and Cochrane reports telling us that the Betahistine is the drug of choice.

The Merriam-Webster Medical dictionary defines Hydrops as distension of a hollow organ with fluid. If Meniere's disease is accepted as endolymphatic hydrops the very definition implies that there is distension due to excessive fluid collection; if we accept this pathophysiology then the antidote for any oedema or fluid collection can be nothing other than agents that will drain out the fluid i.e., DIURETICS, and drugs that will reduce the secretion of fluids in the region. However, the use of diuretics has not become the general accepted mode of treatment in endolymphatic hydrops -Meniere's disease. Till the mid-80's diuretics were found beneficial in MD but somehow the perceptions have changed and DIURETICS have now been dumped in favour of betahistine.

The Cochrane Database of Systematic Reviews of 2010 is used to sell the concept that Diuretics are not beneficial in Meniere's disease. The article in question is a review article titled 'Diuretics for Meniere's disease or Syndrome (review)' by Burgess and Kundu published in the Cochrane Collaboration 2010. The author's conclusion in the review article is that there is insufficient good evidence of the beneficial effects of diuretics in Meniere's disease as the studies were not of high quality due to inappropriate study design or absence of randomised placebo controlled trials; it does not say that diuretics do not work in Meniere's disease.

My own experience as well as that of many others with diuretics has been very good and I have been using diuretics in patients with properly worked up Meniere's disease (typical history, Glycerol test and EcochG +ve documentable SN deafness in all cases and n most cases some evidence of vestibular abnormality) over the last twenty five years. I have mainly used diuretics and carbonic anhydrase inhibitors as their use in endolymphatic hydrops has appeared more rational and scientifically tenable to me. The logic of using diuretics that drain the fluid and drugs like carbonic anhydrase inhibitors that reduce secretion of fluid appears to be more direct and more convincing than the roundabout logic of betahistine increasing blood supply in the stria vascularis and thereby reducing the excessive secretion of endolymph. Moreover the old study of Arrang et al published in the European Journal of Pharmacology shows that this function of the H1 receptors in enhancing blood flow works only at 100 times the therapeutic dosage.

There are 3 ways a drug can an exert beneficial effects in Hydrops. First, by draining away the fluid, second by decreasing the generation of the fluid and lastly by changing the electrolyte composition in the inner ear. Diuretics do all of them. It is true that the hearing improvement/ decrease of tinnitus is not appreciable in long term use in most patients but it does not mean that diuretics do not have any effect. That diuretics induce dehydration and drainage of fluid from the inner ear which causes temporary benefit is evident in the Glycerol / furosemide dehydration test for diagnosis of Meniere's disease. It is proof enough of the reversal of pathology caused by Diuretics even if not permanent. The hearing improvement is not permanent but that the improvement of vestibular symptoms with diuretics is long term has been shown in different studies some of which are detailed below.

Endolymphatic hydrops is considered to be the principal histopathologic characteristic in temporal bones from patients with Meniere's disease. ACETAZOLAMIDE is a Carbonic anhydrase inhibitor and it increases of osmolality in perilymph but not serum osmolality. Carbonic anhydrase inhibitors cause increased excretion of bicarbonate with accompanying sodium, potassium and water. Carbonic anhydrase inhibitors decrease the secretion of fluid and that is the basis of its use in Glaucoma which is a form of hydrops in the eye where excessive fluid (Aqueous humour) is secreted in the anterior chamber of the eye. A study by Heidechi and Kimura in Acta Otoaryngologica (1986) 101:43-52 titled 'Effects of Diuretics in Endolymphatic ' in which experimental endolymphatic hydrops was induced in 77 albino guinea pigs by obliteration of endolymphatic sac and duct showed that 1 month of acetazolamide therapy suppressed the development of Endolymphatic hydrops in the cochlea/ saccule/ utricle. It was also shown that significant dilatation does not take place in the semi-circular canals in most cases. This was a double blind placebo controlled study. It showed that when Acetazolamide was administered to these albino guinea pigs endolymphatic hydrops did not reach the extent of distension shown in animal ears without acetazolamide treatment. Experiments like this prove the efficacy of DIURETICS in Meniere's disease.

Some published reports of symptomatic improvements in patients with Meniere's disease following acetazolamide administration:-

1. Corvera J. *Carbonic anhydrase and internal ear*. Ann Otol Rhinol Laryngol 1956; 65: 351-5.

2. Muftic MK. *Acetazolamide in Meniere's disease.* Arch Otolaryngol 1957; 65: 575-9.

3. Varga G, Miriszlai E, Szab6 LZ. *Experiences with acetazolamide therapy applied in our clinic to patients suffering from*

Meniere's disease for more than 8 years. J Laryngol Otol 1966; 80: 250-69. 14

Animal experiments :-

4 . H. Shinkawa and R. S. Kimura , *Effect of Diuretics on Endolymphatic Hydrops* Acta Otolaryngol (Stockh)1986; 101: 43-52

Some studies that have shown improvements with diuretics in Meniere's disease are as follows:-

1967 Klockhoff +Lindblom- *Htcz in DB trial* – improvement in vertigo and deafness

1974 Klockhoff+ Lindblom -*Chlorthalidone* 7yr follow-up showed -improvement in 76% pts

1986 Deelen+Huizing *Triamterene+Hctz-* improvement only in vertigo

Mechanism of action of diuretics as suggested in literature are:-

1) Carlberg+Farmer (1983) suggested that *-osmotic diuretics like glycerol / furosemide cause rapid dehydration followed by decrease of inner ear pressure*

2) Klockhoff+Lindblom (1967) suggested that *-diuretics not only cause dehydration but possibly also have effects on labyrinthine electrolyte regulation*

3) Deelan+Huizing (1986) – postulated that the mechanism by which *Diazide increases excretion of Sodium but decreases excretion of Pottasium ion transport mechanism in renal tubules and stria vascularis of the inner ear is the same. The authors suggested that long term diuretics have an effect on the function of stria vascularis and consequently on electrolyte regulation in inner ear*

Intratympanic Gadolinium enhanced MRI is the fool-proof test of endolymphatic hydrops as we know today and possibly has more specificity than the electrocochleography test. An IT Gadolinium enhanced MRI evidence of DIURETICS reversing endolymphatic hydrops was published in Acta Oto-Laryngologica, 2009; 129: 1326-1329 authored by Miyagawa et al. The paper titled 'Endolymphatic hydrops and therapeutic effects are visualized in 'atypical' Meniere's disease' has shown endolymphatic hydrops affecting the basal turn of the cochlea that could be completely reversed with osmotic diuretic-ISOSORBIDE for 350days with return of hearing to normalcy.

Conclusions:-

- Diuretics do have a positive role in therapy of Meniere's disease that is evidence based, ethical and scientifically logical
- Betahistine possibly also has a positive role in Meniere's disease as evidenced by many studies but the mechanism of action is not as clear as that of Diuretics
- Action of Betahistine may be at least partly due to its symptom relieving vestibular sedative effect and if so, long term use is not justifiable
- More research needs to be taken up and the use of DIURETICS like ACETAZOLAMIDE/ FUROSEMIDE / HYDROCHLOROTHIAZIDE/ TRIAMTERENE / SPIRONOLACTONE needs a re-think and re-acceptance for treatment of Meniere's disease

COMPUTERIZED VESTIBULOMETRY IN ASSESSMENT OF ENDOLYMPHATIC SAC DRAINAGE IN PATIENTS WITH MENIERE'S DISEASE

[1,2]Lilenko S., [1,2]Yanov Y., [1]Kuzovkov V., [3]Diab H., [1]Lilenko A., [1]Sugarova S.

[1]St.-Petersburg scientific research institute of ear, nose, throat and speech, Russian Federation

[2]North-Western State Medical University named after I.I. Mechnikov, St.-Petersburg, Russian Federation

[3]Federal Clinical ENT Research Centre, Moscow, Russian Federation

Objective: To investigate the state of the vestibular system after unilateral endolymphatic sac drainage in patients with Meniere's disease by means of computerized electrooculography and videooculography as well as computerized dynamic posturography.

Methodology: Forty subjects with definite unilateral Meniere's disease underwent endolymphatic sac drainage (ESD) in 2011 - 2015. The patients (15 men and 25 women) were aged 19-51 years. In all cases, Meniere's disease was refractory to medical treatment; none of the subjects had undergone any surgical interventions before.

The surgical technique was as follows: 1) opening the sac and shunting the endolymph off into the mastoid cavity; 2) 0.1 ml of dexamethasone was instilled into the opened lumen of the sac towards the endolymphatic duct.

Vestibular function evaluation was carried out by means of computerized registration and automatic analysis of both oculogyric and postural reactions. Voluntary saccades, pursuit eye movements, spontaneous nystagmus, cortical and subcortical optokinetic nystagmus (OKN) were recorded and measured with the use of computerized electrooculography (EOG) and videooculography (VOG). Deviations of gravity center in the sensory organization test (SOT) were recorded and automatically analyzed with the help of computerized dynamic posturography (CDP).

These computerized methods of vestibulometry were performed preoperatively and in postoperative follow-up period (in 6 months after unilateral ESD).

Results and significance

Symmetry of voluntary saccades was revealed in all 40 examinees both preoperatively and in long-term postoperative period. Besides stable integrity of central vestibular pathways was demonstrated by smoothness of pursuit eye movements (in 32 and 34 cases, respectively) and regularity of symmetric optokinetic nystagmus (in 33 and 35 patients, respectively).

During the primary examination, 12 subjects experienced horizontal spontaneous nystagmus without gaze fixation. This sign is assumed to confirm peripheral origin of vestibular dysfunction. In long-term postoperative period, spontaneous nystagmus was not elicited in all Meniere's disease patients.

Average absolute asymmetry of subcortical optokinetic nystagmus decreased by 28% in long-term postoperative period

in comparison with preoperative data. Postoperatively, average absolute asymmetry of cortical optokinetic nystagmus decreased by 16%.

Symmetry of horizontal OKN and absence of spontaneous nystagmus gave evidence of vestibular compensation in unilateral Meniere's disease (in 35/40 underwent ESD patients).

The majority of Meniere's disease patients (in 34/40 cases) presented the maintaining balance during SOT in 6 months after unilateral endolymphatic sac surgery. Before ESD, the composite equilibrium score reached 62% on average. In long-term postoperative period, this rating increased to 79% on average.

Conclusions

1. Based on the electrooculographic and videooculographic data, disappearance or absence of spontaneous nystagmus, diminution in asymmetry of optokinetic nystagmus in long-term postoperative period emphasizes positive effect of endolymphatic sac drainage in cases of definite unilateral Meniere's disease.
2. Based on the computerized posturographic data, performance of unilateral endolymphatic sac drainage improves static and dynamic balance in Meniere's disease patients.
3. Based on complex vestibulometric investigation, signs of vestibular function compensation were revealed in most postoperative cases of unilateral Meniere's disease.
4. Endolymphatic sac drainage could be a viable option for patients with early-stage Meniere's disease. This technique dramatically alleviates vertigo spells and prevents hearing loss advance.

SURGICAL MANAGEMENT OF MENIERE'S DISEASE

Dr K P Morwani

Meniere's disease is characterized by a triad of symptoms of vertigo, tinnitus and fluctuant hearing loss and is over diagnosed by general physicians, neurologists and even ENT surgeons.

Majority of patients respond to the conventional line of treatment and also intratympanic injection of various medications, only less than 2 percent of cases will require surgical interventions.

Surgical options are endolymphatic sac decompression, vestibular neurectomy, microvascular decompression of eight nerve, labyrinthectomy and trans lab eighth nerve resection.

In our practice we have been performing endolymphatic sac decompression with shunt placement for four decades in our series of 400 cases, besides surgery we inform them to have low salt intake by 10 to 15 percent and additional potassium in the form of coconut water, sweet lime and banana. we have been following up around 60 percent of patients directly and indirectly, less than 5 percent of patients have come back with recurrent symptoms and almost all of them have defaulted on low salt and high potassium diet in the course of follow ups. None of our patient is given any antivertigenous drugs.

Second surgical procedure is vestibular neurectomy (around 12 cases), and the choice of procedure is discussed in detail with the patient. They are told about the success rate of endolymphatic sac decompression around 70 percent but in our hands its about 90 percent and of vestibular neurectomy around 95 percent, choice is left to the patient and sometimes patients leave the choice upto us, we always prefer to perform endolymphatic sac decompression as first choice, as it is cost effective, can be performed under local anaesthesia as a daycare procedure and patient can resume normal life within a weeks time.

In cases of vestibular neurectomy cost is higher, patient is hospitalized for atleast 3 days for intravenous antibiotics as it's a intracranial procedure. Chances of hearing loss, facial nerve paresis and CSF leak have never been encountered in our small case series.

We have also done microvascular decompression of two patients presenting with hemifacial spasms, tinnitus, vertigo, and sensorineural hearing loss. In both of these cases patients had relief from hemifacial spasms, vertigo and tinnitus and marginal improvement in sensorineural hearing loss.

There have been fair number of cases who have presented with only chronic tinnitus and have taken treatments including intratympanic injections but without relief, MRI showed a vascular loop sitting on the cochlear nerve, patients were offered with microvascular decompression with success rate of around 50 percent but they didn't comply.

Literature also discusses total labyrinthectomy for vertigo control but we have never performed one.

In one case of vertigo, tinnitus and profound hearing loss we have performed trans lab neurectomy which relieved the patient from vertigo but patient didn't had any improvement over tinnitus.

MODERN MANAGEMENT OF MENIERE'S DISEASE

Prof. Levent Ozluoglu, MD

More than 150 years have passed over the first description of Meniere's disease. However, exact mechanisms that underlie or lead to Meniere's disease are still unknown. The lack of knowledge on pathologic process inevitably sources delay in the development of evidence based treatment modalities.

There has been no epochal change in the management of Meniere's disease over the recent years. However, diagnostic tests and treatment alternatives have evolved when compared to those a few decades ago. Videonystagmography (VNG), rotational or balance platform testing, auditory brain stem response and video head impulse tests (vHIT) are more frequently used. Thanks to the advancements in imaging systems, magnetic resonance imaging seems to be a promising tool in the diagnosis of disease.

Migraine is a recently revisited etiologic factor for Meniere's disease and should be covered for both diagnostic and therapeutic purposes.

Treatment of Meniere's disease includes diet, pharmacological agents such as vestibular suppressants, diuretics, histamine analogs, steroids, intratympanic injection with either gentamicin or steroids and surgery. There are current studies carried on at different centers to help the sustained transfer of medicines such as steroids to inner ear (nano-particules, thermosensitive gel).

Air pressure pulse generator (Meniett device) is a relatively new option in the management of patients with Meniere's disease.

Cochlear implantation may be useful in patients with severe to profound hearing loss and in those that are planned to have a simultaneous labyrinthectomy.

March 3rd - Grand Ballroom I

08:00-09:00

HOW I DO IT – CLINICAL EVALUATION OF NYSTAGMUS (ASSOCIATE WITH PERIPHERAL OR CENTRAL VESTIBULAR DISORDERS, AND CEREBELLAR DISORDERS)

Henryk Kaźmierczak

11:00-13:00

INVITED LECTURE - IMPLANTABLE VESTIBULAR PROSTHESES

THE GENEVA-MAASTRICHT VESTIBULAR IMPLANT (VI): RESULTS IN 13 PATIENTS, THE PAST, PRESENT AND FUTURE.

H. Kingma, A. Perez-Fornos, R. van de Berg, N. Guinand, R. Stokroos, M. Ranieri, J-P-Guyot (Maastricht, Geneve)

For many years management of vestibular disorders has been predominantly focussed on the reduction of vertigo attacks for example in patients suffering from Meniere Disease, vestibular neuritis and BPPV. Even ablation of peripheral vestibular function became a common approach in patients with incapacitation vertigo attacks (selective vestibular neurectomy, labyrinthectomy, chemical ablation with gentamicine). So, the impact of vestibular loss upon the human function and quality of life was mostly neglected and often considered as less relevant as it was assumed that sensory substitution and central compensation were sufficient for patients to deal with the vestibular loss. It became however increasingly more clear that that sensory substitution and central compensation are limited. For example head impulse testing and tests of dynamic visual acuity show permanent impairment leading to a reduction of the quality of life. A major decrease in QOL was quantified and very apparent in patients with severe bilateral vestibular loss. We argued therefore that the preservation and restorage of vestibular function should have the same clinical attention and priority as that of hearing or visual deficits. We therefore started to develop diagnostic test that were aimed to objectify the impact of vestibular loss better than the regular approach by quantifying vestibular reflexes by calorics, head impulses, VEMP's or posturography. Parallel to that our research was focussed on the development of vestibular prostheses. In line with the research by Bach Y Rita, we developed a vibro-tactile sensory substitution balance belt that indeed improved balance and QOL in patients with severe vestibular loss. Parallel, we started to develop a vestibular implant (VI) that aimed to restore the VOR as well. In 2007 the first single channel electrode was implanted in humans by our Swiss team lead by Prof. Guyot, who proved that eye movements could be elicited electrically. After developing the specific surgery and technology, our Swiss-Dutch team implanted in 2012 successfully the first 3 channel VI's in humans in the world that aimed to restore vestibular function by connecting gyroscopes to the processor of a modified Medel CI. Since 2012 we implanted 13 patients, without any complication, and obtained and still obtain from them a huge amount of data with good reproducibility that learned us that a vestibular implant (VI) is feasible in humans iand that both VOR and DVA can at least partly be restored. We expect more laboratoria worldwide to follow soon with VI in humans. The current state of the art of our research will be presented and we will anticipate on the future for vestibular implants in routine clinical application that will still take quite a number of years.

Milestones

- 2007: Wall C 3rd(1), Kos MI, Guyot JP. Eye movements in response to electric stimulation of the human posterior ampullary nerve. Ann Otol Rhinol Laryngol. 2007 May;116(5):369-74.
- 2014: Perez Fornos A, Guinand N, van de Berg R, Stokroos R, Micera S, Kingma H, Pelizzone M, Guyot JP. Artificial balance: restoration of the vestibulo-ocular reflex in humans with a prototype vestibular neuroprosthesis. Front Neurol. 2014 Apr 29;5:66.
- 2015: Guinand N, van de Berg R, Cavuscens S, Stokroos RJ, Ranieri M, Pelizzone M, Kingma H, Guyot JP, Perez-Fornos A. Vestibular Implants: 8 Years of Experience with Electrical Stimulation of the Vestibular Nerve in 11 Patients with BilateralVestibular Loss. ORL J Otorhinolaryngol Relat Spec. 2015 Sep 15;77(4):227-240.

Guinand N, Van de Berg R, Cavuscens S, Stokroos R, Ranieri M, Pelizzone M, Kingma H, Guyot JP, Pérez Fornos A. Restoring Visual Acuity in Dynamic Conditions with a Vestibular Implant. Front Neurosci. 2016 Dec 22;10:577.

DEBATE - SMALL VESTIBULAR VS – TREATMENT MODALITIES

SMALL TO MEDIUM SIZE VESTIBULAR SCHWANNOMA (VS): TREATMENT MODALITIES

François Caces
Causse Ear Clinic and Perpignan General Hospital

Hearing preservation as to be considered in managing VS, particularly in case of small (<10 mm) to mid-size (<20 mm) tumors.

Beside size tumor growing, pre-operative auditory status, patient's age, patient's expectation and socio-professional conditions regarding useful hearing are factors that could influence decision making.

With advances in MRI examination, we are able to diagnose smaller and smaller VS that lead to question hearing becoming with or without any treatment.

We would like to emphasize the use of new tools to improve hearing preservation during VS excision. These, in our opinion, can modify our decision making and give new opportunity to preserve function and lead to discuss surgery

indication, challenging radio-stereotaxic therapy, in case of small to mid-size growing tumors.

Our experience with new intra-operative cochlear monitoring (CPA Master© Nihon Khoden) shows that cochlear nerve identification during surgery is enhanced, highlighting efficient cochlear mapping as used for facial nerve.

We present our decision making algorythm for small to mid-size VS managment.

CURRENT MANAGEMENT OF VESTIBULAR SCHWANNOMA USING MINIMALLY INVASIVE TECHNIQUE THROUGH RSA

Arnaud DEVEZE, MD, PhD
Ear & Skull Base Surgery Institute
Clairval Hospital
Ramsay GDS Group
Marseille, France

Nowadays, the management of medium to large vestibular schwannoma has drastically developed toward minimally invasive procedures and a significant trend to reduce morbidity, especially for hearing and facial nerve preservation.

Significant tools are today a employed as a standard: endoscopic dissection, minimally retrosigmoid opening of the internal auditory canal, continuous monitoring of cochlear nerve and of course better assessment of facial nerve, use of intraoperative CT-scan and robotic surgery.

The increasing use and improvement of radiation therapy is a significant add in the global management of tumors, but its indication should be better defined in the therapeutic strategy to avoid over use of radiotherapy in small asymptomatic tumors.

Finally, the vestibular rehabilitation of patients has been improved by the knowledge of vestibular compensation phenomenon and the design of "à la carte" vestibular rehab procedures.

We will be presenting our current procedure for the management of VS, and emphasize on the use of modern tools in the surgical removal of tumors, as well as the current protocol to manage postoperative dizziness. We will also present our algorithm for the management of patients in collaboration with neurosurgeons and oncologist.

TREATMENT MODALITIES FOR SMALL VESTIBULAR SCHWANNOMA

R. Gürkov

Since decades already, the management of Vestibular Schwannomas, and especially of the small tumors, is under debate. Advances in microsurgical techniques, in magnetic resonance imaging of the temporal bone and the cerebellopontine angle, in radiotherapy and in prosthetic hearing rehabilitation have changed the way that clinicians are confronting this common neurotological entity. Today, vestibular schwannomas are increasingly being recognized radiologically in the smallest stages, for example intralabyrinthine schwannomas. A wide variety of microsurgical techniques and approaches is now available to the neurotology field, and increasingly inter-disciplinary teams of neurosurgeons and otosurgeons are collaborating in the surgical management. Vestibular prehabilitation with preoperative Gentamicin treatment enables us to temporally separate the vestibular trauma from the surigcal trauma within the same patient and accelerate postoperative recovery. The goal of complete surgical tumor removal is being weighed against the probability of cranial nerve damage. The increasing body of evidence for long-term results of fractionated radiotherapy is challenging the predominant role of single session stereotactic radiotherapy. Successful reports of cochlear implantations after vestibular schwannoma surgery are challenging the traditional caution attributed to the supposedly neural type of postoperative hearing loss. Furthermore, recent research on Hydropic Ear Disease (Menière's syndrome) in VS patients enables us today to better differentiate between neural and labyrinthine pathologies within VS patients and possibly offers new therapeutic approaches to their vestibular symptoms.

14:00-15:30

DEBATE - CERVICOGENIC DIZZINESS: FACT OR FICTION?

VESTIBULAR TEST FINDINGS IN CERVICOGENIC DIZZINESS

Kamran Barin

Cervicogenic dizziness remains a controversial diagnosis despite ample evidence for association of neck ailments with vertigo and other balance disorders. This is in part due to the fact that the typical diagnostic tests for dizziness often are not helpful in identifying presence or the underlying cause of cervicogenic dizziness. Nonetheless, careful examination of the laboratory and bedside vestibular test results may provide support for the vertigo caused by neck problems. This presentation outlines the findings in the vestibular tests that justify consideration and further testing for cervicogenic dizziness.

CERVICOGENIC DIZZINESS: FACT OR FICTION?

M. Ibrahim HIZALAN
Novomed ENT Center, Bursa

The vestibular system that is the main neurologic complex involved in balance, includes peripherally the vestibular apparatus of the inner ear, the 8th cranial nerve and centrally the vestibular nuclei.

An evaluation of the dynamic balance control will indicate that the vestibular system is assisted by visual system and somatosensation to undertake the sensory organization concerning body position; while ankel, tight and trunk muscles and joints are responsible of body movements to finalize motor coordination.

All the sensory inputs from inner ear, eyes, muscles and joints, regulatory inputs from cerebellum and voluntary inputs from cerebral cortex act at the level of brainstem to determine the sense of balance.

Any derangement of the sensory organization or the motor coordination results in dysequilibrium.

Moreover, non-otologic causes of vertigo are numerous; some of them directly involving the central nervous system (migraine, vestibular epilepsy, multiple sclerosis, intoxications, somatosensory disorders, neoplastic lesions, ...) ; some others indirectly (cerebrovascular and cardiovascular lesions; metabolic, endocrine or hematopoietic disorders, ...). To add to above list visual dizziness, psychogenic vertigo, malingering, vertigoes due to general medical problems, etc ...

Cervicogenic dizziness as well, is one of the non-otologic causes of imbalance but has always been a controversial clinical entity.

The neck contains different elements involved in balance control: the cervical afferents, carotid bodies, carotid and vertebral arteries, and cervical spinal cord. As cervical movements are associated with head movements, symptoms like imbalance, vertigo or dizziness may be attributed to vestibular, vascular, neurovascular, visual, but also to cervico-proprioceptive dysfunction. It is also known that proprioceptive signals from the neck may generate nystagmus and vertigo. The term cervical dizziness/vertigo is mainly reserved for cases where the suspected mechanism is proprioceptive.

On the other hand, the vascular hypothesis, compression of vertebral arteries, associated with recurrent episodes of vertigo with cephalic rotation is a consequence of a mechanical vertebro-basilar involvement, and believed to be not frequent.

If we talk about diagnosis of cervical dizziness/vertigo, unfortunately there are no specific tests, no pathognomonic clinical elements; the only acceptable one being "neck torsion nystagmus".

A well-conducted anamnesis and thorough physical examination excluding neurological, vestibular and psychosomatic disorders is essential for diagnosis.

One can define cervical dizziness/vertigo as an association of some of the following features: aural fullness, headache, neck and scapular pain, cervical stiffness; usually accompanied by cervical osteoarthritis, and/or intervertebral disk degenerative changes; associated with dizziness, unsteadiness and vertigo after cervical rotation. This balance problem may last from minutes to hours and sometimes are associated with true spinning vertigo.

Tenderness and spasm of cervical musculature, sensitivity of trigger areas (Walleix points) of neck and shoulders, loss of cervical lordosis represent the important clinical signs of cervical vertigo.

Differential diagnosis should cover primarly BPPV, VBI, positional vertigo of central origin, traumatic vertigo (central/peripheral vestibular; otolith; perilymph fistula), cerebellar/spinal ataxia, phobic postural vertigo, bilateral vestibulopathy, vestibular paroxysmia.

The treatment is the same as that for the cervical pain syndrome.

In the first place personal preventive measures to protect neck and shoulder muscles from spasm; giving attention to avoid wet and/or windy conditions, cold weather, posture errors, stress, and febrile infections play an important role.

Sometimes exercises and physical therapy are effective in treating patients with vertigo and cervicogenic dizziness. In some others, vestibular rehabilitation associated with manual therapy could improve the patient's symptoms completely and rapidly. A program including physical training and balance can be as helpful. Local heat may improve the stiffness; antidepressants may improve emotional symptoms. Cervico-ocular reflex exercises may help some patients.

Mans Magnusson

Cervical induced dizziness or vertigo is discussed, suggested and criticised for more than a century, and remains controversial. It was already observed during the 19th century that cervical sensory input was important to maintain balance in animals and in early 20th century the Barré-Liéou syndrome was introduced, where a suspected impingement of vertebral arteries during neck torsion were believed to impair blood flow in vertebral arteries and cause secondary balance disturbances.

Today with more advanced capabilities for diagnosis we still lack a diagnostic test for this possible entity. Therefore, we may assess cervical related dizziness with at least two different approaches to. One, from a clinical point of view where clinician will observe a number of patients with neck pain and simultaneously reported unbalance, dizziness or even vertigo. The simultaneous existence of the two symptoms will then lead to the logical assumption of an etiological rather than a coinciding relationship. The second approach would focus on rather well described influence of cervical proprioceptive information in orientation and balance control in both animal and human research. From that one would deduct that a disturbance of structures involved in this proprioceptive mechanisms must be of importance for perceived balance control and hence, a cause of dizziness.

16:00-17:00

INVITED LECTURES

PRINCIPLES OF ELECTRICAL STIMULATION IN BILATERAL VESTIBULAR DYSFUNCTION

Prof Angel Ramos

There is no evidence about an effective treatment for the Bilateral Vestbular Dysfunction .The vestibular labyrinths, (SACCULE AND UTRICCULE). provide sensory input to neural circuits that facilitate accurate perception of spatial orientation and heading, support stable posture, and maintain steady vision Thus, restoring macculae function can return position self awareness to patients with bilateral vestibular dysfunction as well as some (uncomplete) sense of motion.

In this research in the 1st phase we try to Identify Macculae electrical response

There are several studies that provides evidence that a large proportion of patients who have sensoryneural hearing loss and use Cochlear implant have an abnormal perception of vertical perception. Electrical pulses from the CI may help to correct this perception, especially when provided from the side ipsilateral to the tilt, suggests a therapeutic benefit of the implant. 4 adults patients have been involved. Direct stimulation of the Macculae trough posterior area of the Oval window using electrode array with 3 contacts before laberinthectomy due to Meniere disease

was performed.Cochlear Interface Ltd Programming Pod N530. Sound Processor Core (Freedom).The software used has been developed and validated in the Laboratory of ENT Dept using the following tools:Python (for stimulus acquisition) and Matlab R2013b to sent the stimulation to the cochlea and the telemetry of the vestibular response (VRT) is recorded and the registers are visualized

In the 2nd phase we try to establish the safety and effectiveness of a vestibular implant and Identify possible side effects. Inclusion criteria: Adults If they meet the following conditions: Phase Velocity ≤ 5 ° /s in the caloric test (30 and 44 °C); Test of the pathological cephalic impulse to the six CCSS (H <0.8 ; P and S <0.69) Cvemps Ovemps (2 SD) Severe to profound hearing loss.

We will present the actua status of surgical and device preliminary studies.

VESTIBULAR CONSEQUENCES OF ABI

Prof. Mohan Kameswaran MS, FRCS, FICS, FAMS, DSc, DLO
Senior Consultant ENT Surgeon
Madras ENT Research Foundation, Chennai

Aims: Auditory Brainstem Implants (ABI) have become established as a management option for patients with bilateral cochlear aplasia and cochlear nerve aplasia where cochlear implantation (CI) would not be feasible. This paper aims to discuss the vestibular consequences of ABI in 25 patients operated between September 2009 to September 2016.

Materials and Methods: Twenty five patients diagnosed with bilateral cochlear and cochlear nerve aplasia received auditory brainstem implants (ABI) from Sept 2009 to Sept 2016. The retrolabyrinthine approach was used in all patients. Anatomical variations surrounding the lateral recess were seen in some patients and the cerebellar flocculus was graded into 4 types depending on whether it was not visualized, hypoplastic, small or large. All patients were implanted with the Medel device.

Results: All patients had uneventful surgery and intra-op EABR confirmed device placement on the cochlear nucleus. Four patients had dizziness after ABI. In all patients, intra-operatively, the cerebellar flocculus was found to be grade 3 or 4 due to which difficult entry of ABI was noted. More dissection / retraction of flocculus was required for visualization of root entry zone of lower cranial nerves. In all 4 patients, the dizziness settled down within an average of 1 week.

Conclusion: The ABI was used in 25 patients with bilateral cochlear and cochlear nerve aplasia. The outcomes observed in our patients were gratifying. Minor vestibular disturbances were seen in 4 patients.

Keywords: Auditory brain stem implantation, Vestibular consequences

March 3rd – Grand Salon I-II-III

08:00-09:00

HOW I DO IT

A MODEL FOR FELLOWSHIP TRAINING PROGRAM IN VESTIBULAR SCIENCES AND DISORDERS

Radhika Aravamudhan, Girija Sundar
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Audiology as a discipline is composed of many critical aspects of foundational sciences and clinical sciences, supporting multiple areas of specialized practice. General audiology education and training is broad-based, aiming towards providing the knowledge and skills required to provide basic diagnostic and intervention techniques consistent with generalized practice and current standards-of-care. With the expansion of scope of practice in diagnosis and rehabilitation of vestibular disorders, it has become essential for most audiologists to seek additional training to practice in these clinical areas. A major limitation today is that there is no formal mechanism for these post-professional audiologists to further their education in a standardized specialization process, such as the post-graduate fellowships which are offered in other healthcare professions.

In order to facilitate professional growth of audiologists all over the world, we at Salus Osborne College of Audiology is offering a new and ambitious model of specialty training leading to a Fellowship in one of many clinical audiology specialty areas, such as Vestibular Sciences and Disorders, Cochlear Implants, Tinnitus and Hyperacusis, Hearing Aid Technologies and Pediatric Audiology. We propose a one and one-half years' program of post-professional training, including both didactic and hands-on components, designed to translate advancing scientific evidence to best clinical practices and provide fellowship to audiologists with the necessary tools to provide the best care to their patients. The program incorporates blended educational-delivery models to optimize learning and includes an emphasis in evidence-based practices. In the proposed model, enrollees would be required to complete a total lecture, laboratory and workshops and individualized clinical training at an identified center-of-excellence for the specialization under study. The proposed didactic training will be offered via face-to-face instruction, and/or online instruction. The proposed laboratories, workshops and clinical training sites for the Post-Graduate Fellowship program will be at Salus University or at a collaborating research and/or clinical center. We believe that the blended educational model, would facilitate working audiologists to pursue these fellowships with minimal restrictions to their current life situations. The goal is to advance the professional scope of practice and train professionals to be able to practice at the highest level of their scope in their country of practice.

11:00-13:00

SHORT REPORTS

VESTIBULAR QUANTIFICATION IN DILATED VESTIBULAR AQUEDUCTS IN CHILDREN

Dr Soumit Dasgupta
Consultant Neurotologist/Audiovestibular Physician
Alder Hey Children's NHS Foundation Trust, Liverpool, UK
Sheffield Vertigo and Balance Centre, Sheffield, UK
Claremont Private Hospitals, Sheffield, UK
Hony. Lecturer/Tutor, Audiology and Deafness, University of Manchester, UK

Dilated vestibular aqueduct (DVA) is not an uncommon labyrinthine dysmorphic third window condition in children. While the pathophysiology and audiological features are well recognized; knowledge about the vestibular system is limited. This lecture describes vestibular involvement in the condition in children. 18 children (age 4 to 17) were identified in the tertiary paediatric balance clinic in Alder Hey Hospital in Liverpool comprising of 10 with DVA (Group A) and 8 with other third window disorders from semicircular canal dehiscences to high jugular bulbs and dilated IAMs (Group B). All underwent rigorous vestibular investigations with the clinical and the laboratory test battery including VNG and the video head impulse test. All the 10 children with DVA presented with symptoms of a compromise in balance function and on the video head impulse test, there was no statistically significant difference in the mean VOR gain between the 2 groups in the lateral and the RALP planes. However, on the LARP plane, there was a statistically significant difference between the 2 groups with good effect sizes indicating that the DVA group is more likely to have vertical semicircular canal weakness than the non DVA group. Therefore, the population with DVA shows objectively quantified high frequency vertical semicircular canal weaknesses which is crucial information to customize their vestibular rehabilitation for a favourable outcome.

WHAT ARE THE TRUE SYMPTOMS OF CHRONIC PERILYMPH FISTULA?

Jeremy Hornibrook
Department of Otolaryngology-Head and Neck Surgery, Christchurch Hospital and the University of Canterbury, Christchurch, New Zealand.

Perilymph fistula (PLF) has been a contentious topic in otolaryngology and vestibular medicine for over fifty years[1]. The main criticisms have been a lack of reliable symptoms and diagnostic tests, operative traps for reliably distinguishing perilymph from local anaesthetic, and the proof of benefit after repair. It the 1990s it became an emotional issue in otolaryngology with believers and non-believers causing John Shea to claim that descriptions of "spontaneous" perilymph fistulas were a threat to the whole credibility of otolaryngology and that "no characteristic signs, symptoms or diagnostic tests exist....". This is not true, and nearly always a traumatic cause can be found. In the literature there is confusing loose terminology to describe the vestibular symptoms. Chronic window perilymph fistula is a rare example of an *unstable* peripheral vestibular abnormality with a unique balance abnormality[2] and often significant cognitive sequelae[3], and is the most disabling vestibular condition which is curable.

The background to the controversy and features of 23 patients with successfuly repaired window fistulas will be presented, including a 2015 case demonstrating the balance abnormality and profound cognitive features, recently published on Youtube[1].

1. Hornibrook J. Perilymph fistula: fifty years of controversy. ISRN Otolaryngology
Volume 2012, Article ID 281248, 9 pages doi: 10/5402/2012/281248
2. Hornibrook J. A balance test for chronic perilymph fistula. Int J Otolaryngol
Volume 2012, Article ID 16391, 8 pages doi: 10.1155/2012/163691
3 Wackym PA et al. Longitudinal cognitive and neurobehavioural functional outcomes
before and after repairing otic capsule dehiscence. Otology & Neurotology (in press)
4. Jeremy Hornibrook. The balance abnormality of chronic perilymph fistula.
'Perilymph Fistula' on Google search and Youtube reference: https://youtu.be/2DXgQMnlgbw

DOES INTERMITTENT PRESSURE THERAPY USING TMM DEVICE REDUCE ENDOLYMPHATIC HYDROPS IN MENIERE'S DISEASE?: STUDY BY CVEMP TUNING PROPERTY TEST

Toshihisa Murofushi, Masahito Tsubota, Ryota Suizu
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Background: Meniere's disease (MD) is one of the representative diseases of peripheral vestibular vertigo. Close association between MD and endolymphatic hydrops (EH) has been shown. While many patients can be managed by medication such as diuretics and/or steroids, some cannot. They need other types of intervention. Pressure therapy with devices such as Meniett may be a next step to medication. Although effectiveness of pressure therapy has been reported, the mechanism of effects on suppression of vertigo attacks in MD is still unclear. Recently, in Japan, pressure therapy using a different type of device from Meniett, TMM device, has been tried and its effectiveness has been reported.

Objective: To provide supplemental information concerning effectiveness of pressure therapy using TMM device on MD management and to provide preliminary results concerning change of endolymphatic hydrops states by pressure therapy using cVEMP tuning property test.

Subjects and Methods: Six patients who underwent TMM pressure therapy for intractable MD were enrolled. Subjects underwent TMM pressure therapy for 4 months. Their vertigo attacks were assessed by points which were gave to each vertigo attack. When their points decreased lower than 50% in comparison with points in the month just before beginning of the therapy, the therapy was assessed to be effective. We also studied change of

cVEMP tuning property in the subjects. They underwent cVEMP tests using 500 Hz and 1000 Hz tone bursts (125dBSPL air-conducted). Then 500Hz-1000Hz cVEMP slope was calculated.

Results: In 4 of the 6 patients, TMM pressure therapy was effective. Subjects who showed improvement concerning their vertigo attacks showed normalization of cVEMP tuning.

Conclusion: These findings suggested that TMM pressure therapy could be effective and that the effects could be brought by reduction of EH in the vestibular labyrinth.

VESTIBULAR PROFILE IN PATIENTS WITH AUDITORY NEUROPATHY SPECTRUM DISORDER

Tejaswini Patel
Christian Medical College, Vellore: Narayana Hrudayalaya, Bangalore

Introduction: Auditory neuropathy spectrum disorder describes a condition in which a patient's otoacoustic emissions (OAE) are (or were at one time) present, and auditory brainstem responses (ABRs) are abnormal or absent. In some instances, ANSD is identified on the basis of present cochlear microphonics (CM) and abnormal or absent ABRs with or without abnormalities of OAEs. The vestibulocochlear nerve is a sensory nerve that serves the organs of hearing and equilibrium. Vestibular nerve involvement in conditions affecting cochlear nerve is possible. In patients who present with hearing loss in ANSD may also have balance problems due to involvement of vestibular nerve. Electronystagmography(ENG) and VEMP (vestibular evoked myogenic potentials) help to evaluate the inferior and superior vestibular nerves individually.

Objective: To describe the vestibular profile of patients with ANSD

Materials-Methods: 25 patients between the age of 18yrs-65yrs and diagnosed with ANSD were included in the study done over a period of 18months.These ANSD patients were evaluated for Vestibular dysfunction with ENG,VEMP and SVV(Subjective Visual Vertical).

Exclusion Criteria: All patients diagnosed with other morbidities like Meniere's, Migrainous vertigo and Chronic suppurative otitis media.

Conclusion: Patients with ANSD may not have any significant birth history, family history, gender preponderance or co-morbidities. Patients may have bilateral vestibular loss though they might not present with problems of equilibrium. There may be no correlation between degree of hearing loss and vestibular functions. Investigation protocol of ANSD will have to include vestibular function tests

11:00-13:00

INVITED LECTURES

Carlos Oliveira

DEVELOPMENT OF NEUROOTOLOGY AND NES SINCE 1974

Michael Kersebaum

Outline

Specialties developed when doctors either had developed special abilities, or more often access to special equipment. It is easy to see how radiology developed, but less well known that the first laryngologists developed from chest physicians. With the introduction of good lighting sources and mirrors, ENT became established. Audiology received a tremendous boost from the ability to produce a fixed frequency sound at a specified decibel level and hence form an audiogram.

As always, money raises its ugly head. There is a definite correlation between the "incidence" of whiplash and the financial rewards available. In Poland, where insurance companies are not favourable, it is rare. In the U.S.A it is common, and in the U.K. when restrictions on litigation were relaxed, a wave of whiplash claims followed.

Where does this leave us?

We must ensure that those setting themselves up in a position to be referred patients and properly investigate, diagnose and treat them are properly equipped (both in facilities and training) to do this. Equally importantly, patients and the legal and insurance professions must be aware. Without this lies chaos. It is in everybody's (not least the patient's) interest that proper assessment, classification, audit and all the other markers of a proper specialty are adopted. For the field of Neurootology the NES has a great international duty and responsibility to set rules.

The International Society for Neurootology and Equilibrium (NES) was set up at an inaugural meeting at the University of Würzburg 25 May 1974. There were 14 founders from Germany and Argentina representing doctors, scientists and technicians.

The society's aim is to promote clinical Neurootology by developing and standardizing diagnostic methods and clinical examination. Following suggestions from Prof. Dr. Tato and PD Dr. Claussen it was decided that such a society would be a forum by which professionals world-wide could share their views in English, Spanish, French or German.

Following its founding the Society was based in Bad Kissingen but has recently (2016) moved to Budapest, Hungary. Together with the change of place the presidency went over to Dr. Agnes Szirmai and the longtime president Prof. Dr. Claus F. Claussen was awarded Honorary President.

After the first two Members assemblies in Bad Kissingen annual meetings were held successfully throughout the world: Cadiz, Spain 1976; Turku, Finland 1979; Bombay, India 1981; Louvain, Belgium 1983; New Orleans (Louisana), USA 1985; Sao Paulo, Brazil 1987; Knossos (Crete), Greece 1989; Budapest, Hungary 1991; Linköping, Sweden 1993; Hakone, Japan 1995; Haifa, Israel 1997; Anaheim (California), USA 1999; Alghero (Sardinia), Italy 2001; Porto, Portugal 2003; Melbourne, Australia 2005; Kyiv, Ukraine 2007; Guadalajara, Mexico 2009, Nancy,

France 2011; Bydgoszcz, Poland 2013; Prague, Czech Republic 2014; São Paulo, Brazil 2015; Budapest, Hungary 2016 and now Mumbai, India 2017. The years in between were all held in Bad Kissingen.

Because of its meaning for the development of the society the neurootologic diagnostic system, inaugurated by Prof. Dr. Claussen and his wife Dr. Erika Claussen, performed in Bad Kissingen (Neurootological-Network-Diagnostic) will be presented.

March 3rd – Mahogany

11:00-13:00

ELECTRONYSTAGMOGRAPHIC RESULTS IN BPPV

Agnes Szirmai, András Molnár
Semmelweis University, Department of Oto-Rhino-Laryngology and Head and Neck Surgery, Budapest, Hungary

Introduction: Benign paroxysmal positional vertigo is one of the most frequent vestibular disorders. The main symptoms are the short vertigo attacks induced by head position changing, accompanied by vegetative symptoms like nausea and vomitus. In most of the cases a horisonto-rotatory vertigo can be seen in Dix-Hallpike maneuver of the affected side. The cupulolithiasis is responsible for the symptoms. Although the symptoms are typical, the BPPV is underdiagnosed very frequently. The long-lasting misdiagnosis results severe anxiety disorder. In the Hungarian expertise the patients with vertigo are referred to complete neurootological examination to a tertiary referral otoneurological center. The vertigo evaluation mostly needs objective methods, but in some cases the waiting for the tertiary referral center causes a delay of the diagnosis. The aim of our study is to evaluate whether the electronystagmography in the tertiary referral centers is really necessary in the diagnosis of BPPV, or not.

Patients and Methods: Electronystagmography was made after the clinical examination in 103 patients suffering from BPPV. The clinical examination contains detailed case history, otoscopy, spontaneous vestibular symptoms, and Dix-Hallpike maneuver.

Results: None of the patients were spontaneous nystagmus at all. Romberg and blind walking test were clinically normal. Dix-Hallpike maneuver was pathological in 22 patients (21%) at the examination. The retrospective analysis of the patients' medical documentation was helpful in decision, on which side was the disease earlier only in 41% of the cases of normal Dix-Hallpike maneuver. Smooth pursuit eye movement and optokinetic eye-movement were normal. The bithermal caloric test with ENG registration was mostly normal.

Conclusions: Although the electronystagmography could be very helpful in diagnosis of vertigo, most of the patients arrived for examination to the tertiary referral vertigo center in symptom-free period. To achieve the early diagnosis, the main points of examinations are the detailed case-history, spontaneous vestibular symptoms, and the Dix-Hallpike maneuver. The correct documentation of vestibular symptoms is necessary. Electronystagmography cannot replace the early diagnosis of BPPV in the emergency department, based on the case history and the Dix- Hallpike maneuver.

ROLE OF VIDEO HIT IN DIFFERENT OTONEUROLOGICAL PATHOLOGIES

Maurizio Barbara, Edoardo Covelli, Francesca Atturo, Silvia Tarentini, Vania Marrone, Simonetta Monini
NESMOS Department, ENT Clinic, Sapienza University, Rome, Italy

The video head impulse test represents a modern tool to assess the vestibulo-ocular reflexes and it has been widely reported to be applied in different pathologies affecting the vestibular apparatus as well as some other temporal bone pathologies. During the last 2 years, several subjects referring to the outpatient ward at Sant'Andrea Hospital in Rome were selected for having a vHIT for a better elucidation of their pathology or for depicting specific features when the pathology was known. The assessment mostly regarded: Ménière's disease; Minor syndrome; fistula of the semicircular canal due to cholesteatoma; BPPV. Also some other ear pathologies were investigated. While for some pathologies, the vHIT was consistent with the clinical findings, in some other occasion a mismatch or inconsistent findings were found. This preliminary clinical experience is supporting the use of vHIT in all the clinical conditions that may affect the vestibular function, being a fast and easy-to-perform technique. Whether it is going to fully replace the conventional (caloric, rotatory chair, etc.) vestibular work up remains a subject for further elucidation.

CAN QUANTITATIVE HEAD IMPULSE, OCULOMOTOR AND PURE TONE AUDIOMETRY TEST (HINTS+) DIFFERENTIATE CENTRAL FROM PERIPHERAL CAUSES OF ACUTE VERTIGO?

Dr. László T. Tamás[1], Dr. Andrea Mike[2], Dr. Tibor Garai[1], Dr. Tamás Tompos[1], Dr. István Király[3], Dr. Tamás Nagy[3], Dr.árpád Vadvári[3], Dr. Ágnes Szirmai[4]
[1]Aladár Petz University Teaching Hospital, Department of Otorhinolary ngology, Head and Neck Surgery, Győr, Hungary
[2]Aladár Petz University Teaching Hospital, Department of Neurology, Győr, Hungary
[3]Markusovszky University Teaching Hospital, Department of Radiology,Szombathely, Hungary
[4]Semmelweis University, Department of Otorhinolaryngology, Head and Neck Surgery, Budapest, Hungary

Objective: Vestibular neuritis is often mimicked by stroke (pseudoneuritis).A careful bedside oculomotor examination – HINTS+ (Head Impulse test,Nystagmus, Test of Skew and sudden deafness)-reliably identifies stroke. Using a special test glasses and pure tone audiometry every component of the new test can be made objective and repeatable. Our goal was to investigate the usefulness of quantitative measurement of HINTS+ in a prospective study. All of our patients were suffering from Acute Vestibular Syndrome (AVS).

Methods: After routine neurologic and otologic bedside examinations, measurement of HINTS + method was done using

high-speed infrared video head impulse testing (vHIT) and pure tone audiometry, and the cases with suspicion of stroke were examined by medical imaging (brain magnetic resonance imaging, brain computer tomography, and color doppler ultrasound of the vertebral arteries). Between 2016 March and December 97 patients (51 female, 46 male) were enrolled with AVS present themselves in the ED of our hospital.

Results: Among patients 62 vestibular neuritis cases and 22 posterior inferior cerebellar artery (PICA)- territory, and 13 anterior inferior cerebellar artery (AICA)- territory stroke cases were found using the objective HINTS+ method (vHIT and audiometry). 27% central type nystagmus, 4% skew deviation, 9% sudden deafness and 100 % normal head impulse test were diagnosed among the PICA territory stroke patients.25% central type nystagmus, 33% skew deviation, 66% sudden deafness and 17% normal head impulse test were found among the AICA territory stroke patients. Using radiologic verification of central pathology 10 false positive stroke cases were found. (1 long-lasting vestibular migrain,1 multiple sclerosis and 8 viral labyrinthitis or labyrinthstroke). Among the neuritis cases we found 37 superior neuritis, 16 superior+inferior neuritis and 6 isolated inferior neuritis and 3 viral labyrinthitis (or labyrinthstroke) cases. 64 percent peripheral and 36 percent central cases were found among the 97 patients suffering from AVS.

Conclusions: PICA strokes were readily separated from neuritis using head impulse test alone, but AICA stroke was at risk of misdiagnosed based on head impulse test alone. Isolated labyrinth stroke could not be detected by our medical imaging method. Isolated inferior neuritis could be diagnosed only using the objective HINTS+ method. High-speed infrared video head impulse testing and pure tone audiometry are probably suitable for quantitative measurement of HINTS+ battery and can differentiate central from peripheral cases of AVS.

ULTRASOUND-COMPUTER-CRANIOCORPOGRAPHY RESULTS IN BPPV

Dr. Stefani Maihoub, Prof. László Tamás, Dr. Ágnes Szirmai
Semmelweis University, Department of Oto-Rhino-Laryngology and Head and Neck Surgery, Budapest, Hungary

Introduction: One of the most common vestibular disorders in adults is the benign paroxysmal positional vertigo. Clinical researches have shown that it is caused by cupulolithiasis, which induces short vertigo attacks when head position changes. It is accompanied also by vegetative symptoms such as nausea and vomitus. BPPV can be categorized into secondary or idiopathic. Although the typical symptom is the rotatory nystagmus in Dix-Hallpike manouvre, the patients often suffered from imbalance. Evaluation is based on objective methods, such as Ultrasound computer craniocorpography which can register the standing and stepping of the patients.

Patients and Methods: 108 patients, suffering from BPPV were examined furthermore with the help of ultrasound computer craniocorpography. The clinical examination contains detailed case history, otoscopy, spontaneous vestibular symptoms and Dix-Hallpike maneuver.

Results: Based on the standing test parameters, the longitudinal, and the lateral sway minimally increased. Extremely increased forehead covering values showed the vestibular lesion and severe imbalance of the patients in the cases of secondary BPPV. In the stepping test the only parameter showing mildly increased values is the lateral sway. The higher value of self-spin degree in secondary BPPV showed the severity of the vestibular lesion.

Conclusions: The objective results from the US-COMP-CCG parameters show also the deterioration of the vestibular system as well as the change in values, based on the cause of the BPPV. Idiopathic BPPV results mostly normal values of US-COMP-CCG, while the values of secondary BPPV show the deterioration of the whole vestibular system. These facts could be helpful of the differential diagnostic procedure of positional vertigo.

EFFICACY OF VESTIBULAR REHABILITATION PROGRAMS IN UNILATERAL VESTIBULAR WEAKNESS

Fazıl Necdet Ardıç[1], Hakan Alkan[2], Funda Tümkaya[1], Füsun Ardıç[2]
[1]Pamukkale University Department of Otolaryngology
[2]Pamukkale University Department of Physical Medicine and Rehabilitation

Objectives: The aim of this study was to compare the efficacy of a home based vestibular rehabilitation program, posturographic biofeedback training and whole body vibration therapy on balance, fall risk, vertigo symptom severity and functions in patients with unilateral vestibular weakness.

Materials-Methods: A total of 75 patients who were diagnosed as unilateral vestibular weakness were enrolled in this randomized controlled study. All patients received a comprehensive assessment including pure tone auidometry, videonystagmography, static posturopraphy. They were randomized into one of three groups; home-based vestibular rehabilitation (n=24), posturographic biofeedback training (n=24) and whole body vibration training (n=25) group. Home-based vestibular rehabilitation program was given to each group. Vestibular rehabilitation exercises were prescribed as once daily with 10 repetitions at home for one month. Biofeedback training and whole body vibration training were performed five days a week during a month for 20 minutes for a total of 20 sessions. At the beginning and at the end of the study, fall risk yielded by posturography, Berg balance test (BBT), Timed Up-and-Go (TUG) test, vertigo visual analogue scale (VAS), Dizziness Handicap Inventory (DHI), were filled by a doctor who is blinded to the type of intervention.

Results: There were no statistically significant difference between groups according to demographic characteristics and baseline evaluation parameters. Whereas improvements in risk of falling were found only in the whole body vibration training group, there were statistically significant gains on balance, vertigo VAS, DHI scores at the end of study in all groups when compared to baseline. The whole body vibration group was statistically superior to biofeedback training and home-based vestibular rehabilitation groups in all parameters except TUG (functional mobility) ($p<0.05$).

Conclusion: Whole body vibration training, is effective in reducing risk of falling and more effective than home home-based

vestibular rehabilitation for improving balance, vertigo severity, the handicap arising from vertigo.

THE EVALUATION OF VESTIBULAR FUNCTION IN PATIENTS WITH CHRONIC SUPPURATIVE OTITIS MEDIA

Badr Eldin Mostafa
Ain-Shams University

Objective: The objective of this work is to assess the vestibular functions in patients of chronic suppurative otitis media without and with sensorineural hearing loss.

Study Design: Prospective case study.

Setting: Tertiary referral University Hospital

Patients: Sixty patients with chronic suppurative otitis media (CSOM). We excluded patients with a history of head trauma, ototoxic drugs, diabetes, hypertension, previous ear surgery, neurological deficits and suspected fistulae

Intervention: Patients underwent basic audiological evaluation, clinical and instrumental vestibular evaluation.

Main Outcome Measure: The incidence and extent of vestibular dysfunction in patients with chronic suppurative otitis media

Results: There were 42 males and 16 females with a mean age of 29.5 yrs. Forty ears had tubotympanic disease and 19 with ch lesteatoma. There were 14 ears with sensorineural hearing loss. A positive history of vertigo was elicited in 53.5% of cases. Rotatory chair abnormalities were found in 70% and caloric hypofunction was found in 61.6% of case. VEMPs were abnormal in 25%.. The only positive correlation with vestibular dysfunction was the duration of disease.

Conclusions: The vestibular system is significantly affected in cases of CSOM. Both semicircular canals and the saccule are affected. All patients with long standing CSOM should be evaluated for vestibular dysfunction irrespective of their hearing levels.

VOR GAIN IN PATIENTS WITH ENDOLYMPHATIC HYDROPS

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Background: The head impulse test (HIT) is a clinical test comprising high acceleration, low amplitude head rotation, a bedside test to identify peripheral vestibular deficits. Deficit of the vestibulo-ocular reflex (VOR) may not be diagnosed because corrective saccades cannot always be detected by simple observation and naked eyes. The video head impulse test (vHIT) is a new objective test of dynamic semicircular canal (SCC) function and VOR gain.

Objective: The purpose of this study is to show presence of high VOR gain in patients with endolymphatic hydrops. Specifically, data were obtained for 100 patients with and without endolymphatic hydrops.

Study Design: The vHIT was administered to each participant. Participants were seated, wore video goggles, and instructed to maintain their gaze on a visual target located on a wall at a distance of 1 meter. A high-speed (250 Hz) video camera, an accelerometer and a gyro meter are embedded in the video goggles and recorded eye (right eye) and head movement. The examiner stood behind each participant and rotated their head in the horizontal plane in two directions (left and right) resulting in the stimulation of the left and right horizontal SCCs. Participants underwent a minimum of 20 head impulses in each direction. The significant effect of SCC (right horizontal SCC versus left horizontal SCC) on VOR gain is likely to be clinically relevant as the average VOR gain for the right and left horizontal SCCs was increased in patients diagnosed with endolympatic hydrops based on clinical presentation and electrocochleography respectively.

Results and Conclusion: Comparing these two groups, the patients with hydrops show statistically significantly higher VOR gain compared to the patients without hydrops. Combination of video head impulse testing and EcochG results may prove helpful in the diagnosis of Ménière's disease.

14:00-15:30

ROUND TABLE - A RESUME OF EAONO WORKING GROUP OF CONSENSUS STUDIES ON VERTIGO

PAEDIATRIC VESTIBULAR DISORDERS – VERTIGO IN CHILDREN

Dr Soumit Dasgupta
Consultant Neurotologist/Audiovestibular Physician
Alder Hey Children's NHS Foundation Trust, Liverpool, UK
Sheffield Vertigo and Balance Center, Sheffield, UK
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Peadiatric vestibular pathology and vertigo in children are often unrecognized and often do not present with vertigo as a presenting feature of vestibular disorders. The history is often surrogate from parents and is very different from that in adults. Assessment is an art as children might not follow instructions properly except when older and the clinical and laboratory test battery are similar to adults but much more difficult to perform. The prevalence of vestibular disorders is 5 – 15% up to the age of 18 and a third of all cochlear hearing losses will present with a concomitant vestibular problem. The commonest pathologies encountered are peripheral vestibulopathies and benign paroxysmal vertigo in childhood in addition to more rare lesions like posterior fossa space occupying lesions. Proper diagnosis is crucial as the interface between neurology, developmental paediatrics and neurotology is much more overlapping than that in adults. This leads to appropriate rehabilitation for effective and favourable outcome. This presentation highlights all these issues regarding this relatively less known and under diagnosed disease spectrum in children which constitutes important morbidity.

BPPV: TREATMENT RECOMMENDATIONS

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The following recommendations are extacted largely from the draft version of the American Academy of Otolaryngology Head and Neck Surgery Clinical Practice Guideline: Benign Paroxysmal Positional Vertigo (BPPV), which can be reached online (http://www.entnet.org/?q=node/335) with the tentative publication time as being March 2017.

The authors personal recommendations are added with the abbreviation ''EAG'' at specified sections.

The spontaneous recovery rate: 35% - 50% of (Burton, 2012), However, significant improvements in the timely treatment of patients with BPPV resulted in quality of life improvements, as well as medical and societal cost savings avoiding unnecessary testing.

Treatment options for BPPV

Observation as initial therapy	Clinicians may offer observation with follow up as initial management for patients with BPPV	Option
Vestibular rehabilitation therapy	Clinicians may offer vestibular rehabilitation, either self-administered or with a clinician, in the treatment of BPPV	Option
Repositioning procedures as initial therapy	Clinicians should treat, or refer to a clinician who can treat, patients with posterior canal BPPV with a canalith repositioning procedure	Strong recommendation
Post procedural restrictions	Clinicians should not recommend post- procedural postural restrictions after canalith repositioning procedure for posterior canal BPPV.	Strong recommendation (against)
Medical therapy	Clinicians should not routinely treat BPPV with vestibular suppressant medications such as antihistamines and/or benzodiazepines	Recommendation (against)
Outcome Assessment	Clinicians should reassess patients within 1 month after an initial period of observation or treatment to document resolution or persistence of symptoms	Recommendation
Evaluation of treatment failure	Clinicians should evaluate or refer to a clinician who can evaluate, patients with persistent symptoms for unresolved BPPV and/or underlying peripheral vestibular or central nervous system disorders	Recommendation
Education	Clinicians should educate patients regarding the impact of BPPV on their safety, the potential for disease recurrence and the importance of follow-up	Recommendation

POSTERIOR CANAL BPPV

Epley and Semont maneuvers both have a similiar tretment effect, that is CRPs (Epley, Semont) are more effective compared to sham maneuvers, medical treatment (EAG) controls or vestibular rehabilitation.

HORIZONTAL CANAL BPPV TREATMENT

It is paramount to determine the side of the sick ear and type of the nystagmus (geotrophic or apogeotrophic) before CRP treatment in horizontal canal BPPV (EAG). There are a lot of methods to determine the affected ear in horizontal canal BPPV like Sitting up or Lying down nystagmus, Head Pitch Test and Bow and Lean Test. However, Ewald's second law is the easiest and most convenient method to determine the diseased ear; if the nystagmus is geotropic, then the side with the strongest nystagmus is the affected ear; if the nystagmus is apogeotropic, then the side opposite the strongest nystagmus is the affected ear (EAG)

For geotrophic type horizontal canal BPPV, Barbeque and Gufoni maneuvers and Vannucchi forced prolonged position (EAG) are more effective compared to sham maneuvers, controls, medical treatment (EAG) or vestibular rehabilitation.

For apogeotrophic type horizontal canal BPPV, Reverse Epley or Semont manuvers (EAG), modified Gufoni or therapeutic headshaking are more effective compared to sham maneuvers, controls, medical treatment (EAG) or vestibular rehabilitation.

VESTIBULAR REHABILITATION

Vestibular rehabilitation should be used as an adjunctive therapy rather than a primary treatment modality. Subsets of patients with preexisting balance deficit, CNS disorders or risk for falls may derive more benefit from VR than the patient with isolated BPPV.

MEDICAL TREATMENT

Pharmacologic treatment of symptoms with vestibular suppressant medications are not recommended, other than for the short term management of autonomic symptoms such as nausea or vomiting in a severely symptomatic patient. Betahistine teratment in addition to Epley maneuver is recommendedn to improve the residual symptoms and qulaity of life of selected patients with psoterior canal BPPV patients (EAG). Vitamine D deficiency should be investigated in all patients, supplementation is recommended if necessary in order to reduce the rate of recurrences.

OTHER ISSUES (EAG)

There are unique cases who require special management. Post-traumatic BPPV is generally more symptomatic, refractory and/or bilateral. The side with the greater vertigo/nystagmus should be treated at first, the other side should be treated 1 week later, if necessary. Postmaneuver restrictions/medical treatment may be necessary in those cases. Apogeotrophic horizontal canal BPPV is generally accompanied by more severe and persistent symptoms; several consecutive maneuvers (reverse Epley/Semont, modified Gufoni, therapeutic headshaking) may be attempted. Hospitalization for for Vannucchi maneuver and/or daily checks with positional test and/or CRPs may be necessary.

Accompanying anxiety/panic disorder may be a trigger for more chronic disabling dizziness even after successful treatment

maneuvers; psychological support/treatment and close counseling may be necessary in those cases.

VESTIBULAR RECOVERY AFTER VESTIBULAR NEUROTOMY

Lacour Michel
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Vestibular neurotomy leads to a complete, total and sudden loss of vestibular inputs on one side. This surgical approach of vertigo patients is followed in animal models by the expression of many plastic events in the vestibular nuclei (VN) on the lesion side, most of them being the up-regulation of neuronal signatures expressed during the developing brain in the young animal. We have clearly documented the re-expression of immediate early genes, neurotrophines, as well as structural reorganizations including both synaptogenesis and neurogenesis. Most interesting is that these neurobiological signatures are observed during an opportunity window covering the first post-lesional month in the cat model (see Lacour et al., J Neurol. 2015). According to our knowledge in vestibular loss patients, this critical stage for recovery should cover the first three months after surgery. The sequence of vestibular recovery after vestibular neurotomy should dissociate the acute and the chronic stages.

The acute stage can be seen as the first 2-4 days after the nerve section, a period during which the main goal is to suppress the disabling symptoms like nausea, vomiting and vertigo. This can be achieved by pharmacological treatments including anti-emetic drugs and anti-histaminics. These drug treatments should be stopped fastly since they are known to delay the vestibular compensation process. In the same time, exercises aimed at suppressing the spontaneous nystagmus by visual fixation must be started.

The chronic stage begins as soon as the patient is free of his/her neurovegetative symptoms, usually after 2-4 days. Drug treatments aimed at rebalancing the activity of the VN cells on both sides are recommended. They include drugs with effects on neurotransmitters and neuromodulators (histaminics like betahistine dihydrochloride) and drugs with effects on voltage-gated ion channels (calcium channel blockers). Vestibular rehabilitation therapy must be done as early as possible, in a progressive way, to favour the dynamic recovery of balance and gaze in more and more challenging conditions. Sensory and behavioural substitution processes underlie the functional recovery after vestibular neurotomy, the ultimate goal being for the patients to regain a good quality of life.

RECOMENDATIONS FOR DECISION MAKING IN THE TREATMENT OF BILATERAL MENIERE DISEASE

Jose A. Lopez-Escamez[1,2] on behalf of the EAONO Vertigo Committee
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Bilateral Meniere disease (BMD) is a set of rare disorders characterized by low-frequency fluctuanting sensorineural hearing loss, episodic vestibular symptoms including vertigo and dizziness and tinnitus associated with the episodes of vertigo. Since the progression of vertigo episodes and hearing loss may be variable, a detailed clinical history is necessary to define the clinical variant, the familial history and the concurrent associated disease, such migraine or autoimmune disease (AD) that may drive the final therapy. We have identified five clinical subgroups: group 1 is the most frequently found, and it is defined by metachronic hearing loss without migraine and without AD; group 2 is defined by synchronic hearing loss without migraine or AD; group 3 is familial MD, with clinical and genetic heterogeneity between families; group 4 are patients with MD and migraine and group 5 is autoimmune BMD secondary to another AD. The treatment is aimed to maintain low levels of vasopressin (AVP) by a low sodium diet, water overload, since the sudden increase of AVP triggered by sodium, dehydration or cortisol (raised in stress) may facilitate endolymphatic hydrops. The standard treatment should be oral or intratympanic steroids, but surgical options should be considered including cochlear and vestibular implantation, an area of extensive research.

We present recommendations for personalized decision marking according to the duration of disease, clinical variant and the associated comorbidities. Conservative therapy including steroids should be maintained during the first 5 years in most clinical variants, with the exception of a rapid, progressive sensorineural hearing loss. Cochlear implantation should be considered in BMD types 2 and 5, and gene therapy should be limited to familial BMD type 3 or sporadic cases with defined mutations.

RECOMMENDATIONS ON THE DIAGNOSIS OF BPPV

Marco Mandala

Diagnostic criteria for benign paroxysmal positional vertigo (BPPV) represent a key point due to the incidence of the disorders and its possible effects on quality of life in patients.

The diagnostic criteria are, at the present time, well established for posterior and lateral canal BPPV. The last revision of these criteria that are part of the International Classification of Vestibular Disorders will be presented and discussed.

Other recently proposed variants, like anterior canal BPPV, peripheral positional downbeat nystagmus and apogeotropic posterior canal BPPV will be presented and discussed with explicative videos and Literature review in order to reach a consensus on these controversial entities.

March 4th – Grand Ballroom II-III (Main Hall)

08:00-09:00

HOW I DO IT - COCHLEAR IMPLANTS AND MENIERE'S DISEASE

COCHLEAR IMPLANTATION IN PATIENTS WITH UNILATERAL HEARING LOSS AND MÉNIÈRE´S DISEASE

Prof Angel Ramos

Patients with advanced unilateral involvement with Ménière's Disease may present a challenge to conventional criteria for cochlear implant candidacy . We observed significant benefit over baseline in a series of patients with Ménière's syndrome who progressed, severe-to-profound sensorineural hearing loss and underwent cochlear implantation at hte same time that labyrinthectomy,

Our results demonstrate that patients with Definitive Ménière's Disease may obtain benefit from cochlear implantation.Specific programming of the implant is needed in order to achieve a better response (tinnitus) and so C.I. improve speech comprehension in patients, in our serie, suffering from unilateral Meniere disease. Bilateral benefit is observed in patients using hearing aid in contralateral side and is also observed in unilateral heariing loss patients.

09:00-10:30

PLENARY – VESTIBULAR REHABILITATION

NEUROPLASTICITY AND VESTIBULAR REHABILITATION

Lacour Michel

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The lecture questions the relationships between the plastic events responsible for the recovery of the vestibular functions following a unilateral vestibular loss, that is, vestibular compensation, and the procedures used by the physiotherapists to improve the functional recovery, that is, vestibular rehabilitation therapy (VR).

The main objective is to provide clinicians with an understandable view on *When* and *How* to perform VR, and to explain *Why* VR may benefit from basic knowledge collected in animal models, and *How* VR theray may alter the recovery mechanisms.

There is a critical period after vestibular injury during which most of the plasticity mechanisms described in the developing brain are re-expressed. These early plastic events depend however of the real nature of the vestibular loss, with strong structural reorganizations of the neuronal networks after sudden and total loss, and more functional adaptations after progressive and partial loss. This early plastic window of opportunity varies therefore as a function of vestibular aetiology, and the optimal timing of VR therapy and how VR therapy must be tailored depend on this cross-talk between retraining procedures and post-lesion vestibular plasticity mechanisms.

To get fast recovery and to ensure good quality of life of their vestibular loss patients, the physiotherapists have to respect some common sense principles (i.e., early active retraining), to improve and/or change their sensorimotor performances (i.e., gaze and postural stability, orienting), and to find why the patients show a poor functional recovery (i.e., anxiety, stress, maladapted or avoiding strategies, ...).

CLINICAL VALUE OF SACCADES FOR THE EVALUATION OF HOME-BASED VOR REHABILITATION

Juan M. Espinosa-Sanchez[1,2], Angel Batuecas[3], Jose A. Lopez-Escamez[1,2]

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Vestibular rehabilitation (VR) is aimed at promoting the physiological process of compensation in patients with a vestibular loss. These compensatory mechanisms include adaptation and substitution. One the main goals of VR is enhancing gaze stability to reduce visual blurring during fast head movements. With this purpose, a variety of exercises have been designed to favour vestibular adaptation and by increasing the vestibulo-ocular reflex (VOR) gain, thus improving gaze stability. Compensatory saccades, central preprogramming and an increment in smooth-pursuit gain are alternative substitution strategies to help gaze stability.

Our VR programme in patients with a vestibular hypofunction mainly consists of home-based exercises. Video-head impulse test (vHIT) has proved to be a good tool for monitoring the vestibular compensation. The analysis of the vHIT recordings during the follow-up of these patients may demonstrate a progressive recovery of the VOR gain. In those patients without a gain recovery, the study of the timing strategy of the refixation saccades has prognostic value. Thus, well-organized saccades, isochronically gathered and arranged in clusters, offer a better prognosis while a scattered pattern with disorganized saccades is associated to a greater level of disability and imbalance.

11:00-13:00

INVITED LECTURE - VESTIBULAR PREHABILITATION – WHEN AND WHY

VESTIBULAR PREHAB OR 'LOOSING VESTIBULAR FUNCTION WITHOUT PAIN'

Måns Magnusson & Fredrik Tjernström

The symptoms of acute vestibular loss are wellknown. We also know that some centralnervous lesions, especially those of the posterior fossa , may severely reduce the ability to compensate and return to normal life, after an additional vestibular lesion. In cases pontine angle surgery, or planned vestibular ablation, the time of the vestibular loss is known in advance, By separating the sensory loss from the surgical trauma, with pre-treatment with intratympanic gentamicin, does the postural control system benefit from a better rehabilitation both in long-term (habituation) and short-term (adaptation) performance, when experiencing a postural challenge or resolving a sensory conflict. The better compensation in PREHAB patients could be attributed to; active motor learning as the vestibular function slowly attenuates, no central nervous dysfunction due to effects from surgery and a priming of the postural control system to function in a new sensory context prior to surgery. Reasons for worse compensation in the other patients could be; immobilization due to nausea and vertigo after surgery, harmful amount of stress and cognitive dysfunction from the combination of surgical and sensory trauma and an abrupt vestibular deafferentation and its consequences on sensory reweighting.

This by introducing a rehabilitation program previous and then in parallel with a gradual loss of vestibular function, a timely compensation could be achieved simultaneous with a lesion and thus actually avoiding most of the symptoms. It could also be demonstrated that such a procedure has longtime benefits for patients undergoing pontine angle surgery.

ROUND TABLE - BPPV IS THERE A CONSENSUS ON ITS TREATMENT?

DIAGNOSIS, TREATMENT OF BPPV AND BPPV INDUCED ANXIETY DISORDERS

Ludmila Antonenko
I.M. Sechenov First Moscow State Medical University

Introduction: BPPV is the most common cause of vertigo that can be diagnosed by outpatients. However, BPPV often remains under-diagnosed. The effectiveness of treatment of BPPV depends on the correct diagnosis causes of vertigo. Long-existing undiagnosed BPPV can become the reason of anxiety, depression and psychogenic vertigo.

Materials and methods: We examined referral letters and medical records of 260 patients with BPPV (84 men - 176 women) aged 34 to 82 years who were treated in clinic of Nervous Diseases at I.M. Sechenov First Moscow State Medical University during the years 2009-2016. Disease duration was from 3 days to 2 years. Every patient was examined by neurologist in clinic of Nervous Diseases, who made the following tests: the head impulse test (Halmagyi test); position of the sample Dix-Hallpike and McClure-Pagnini; Unterberger and Romberg trials; performed orthostatic hypotension, evaluated emotional status according to the hospital anxiety and depression scale (HADS); videonystagmography and stabilography. We reviewed referral diagnosis to each patient included in this research and compared them with final diagnoses after examination in clinic of Nervous Diseases. All patients with posterior canal BPPV were carried out Epley and Senont-Toupet repositioning maneuvers. Patients with horizontal canal BPPV were carried out Lempert repositioning maneuvers. Patients with bilateral posterior canal BPPV were carried out repositioning maneuver primarily on the side with more severe vertigo and nystagmus; and after one week patients were carried out repositioning maneuver on the other side. All patients were treated by betahistine (24 mg, 2 times daily) one month after repositioning maneuver. The observation period was 6 months. The patients with anxiety disorders, which were diagnosed after a month of repositioning maneuver, got additional treatment. It included 3 sessions of cognitive-behavioral psychotherapy, taking antidepressants for 3 months, which were chosen individually, and 5 sessions of vestibular exercises one time per day with a doctor. The patients were instructed how to proceed vestibular exercises on their own at home 2 times a day for 3 months.

Results: All patients were observed by other doctors before the treatment in the clinic. Only with 32 patients (12%) the cause of dizziness was suspected BPPV, and in other cases different diseases were mistakenly assumed. Mistakes in the diagnosis of BPPV were in all cases (100%) of atypical BPPV and in the majority (87%) patients with typical BPPV. In 93 patients (38%) duration of undiagnosed BPPV was from 1 to 3 months, in 83 patients (32%) — less than a month, and in 78 patients (30%) - more than 3 months.

Canalolithiasis posterior semicircular canal was diagnosed in 245 (94,2%) patients, included in the research (right — in 54% of cases, left — in 32%, bilateral — in 14%). Canalolithiasis horizontal semicircular canal (geotropic option) was identified in 15 patients (5.8%). The typical symptoms of BPPV were observed in 92% of cases. 21 patients (8%) with BPPV complained about instability.

There was a high efficacy of repositioning maneuvers (100%). Monitoring of patients in the dynamics showed that in a month signs of BPPV absolutely regressed in all patients, Dix-Hallpike and McClure-Pagnini manoeuvre were negative. With 26 patients (10%) were noted complaints of a feeling of instability, body swaying, attack-like fear of falling and the recurrence of episodes of dizziness, which were intensified in the street, in the supermarket, in empty rooms. While repeated neurovestibular examination revealed no pathology. The levels of anxiety and depression in Hospital scale of anxiety and depression were increased in these patients. The frequency of anxiety disorders after effective treatment of BPPV was significantly higher in the group of patients with duration of undiagnosed BPPV more than three months, 21.8% (17 patients). In the group of patients with disease duration of 1-3 months anxiety disorder was noted in 6.4% (6 patients) and in patients with disease duration less than a month - in 3.6%

(4 patients). Absolute regression of anxiety disorders on the background of the treatment was observed in 73% (19 patients). In 27% (7 patients) the severity of anxiety and depression on the Hospital scale of anxiety and depression significantly decreased.

Conclusion: the results of the research showed the low level of awareness among doctors about BPPV, the effectiveness of repositioning maneuvers of BPPV, no retries of BPPV during six months after repositioning maneuver and the monthly course of using betaserk in a daily dose of 48 mg. Anxiety disorders in patients with BPPV were significantly more prevalent in patients with long-existing undiagnosed BPPV. It was noted the positive effect of complex treatment of anxiety disorders, including the use of psychotherapy, antidepressants and vestibular exercises.

14:00-15:30

ROUND TABLE - VESTIBULAR MIGRAINE

VESTIBULAR MIGRAINE TREATMENT

Nese Celebisoy

Only a few randomized controlled clinical studies have been conducted on the specific treatment of VM: during the attack or as prophylaxis.

The study on triptan treatment of the attacks is inconclusive due to the small number of patients (n: 10) and attacks (n: 17) included (1).

For the prophylactic treatment a study comparing metoprolol and placebo is still going on. Since none of the available studies are adequate, most therapeutic recommendations for the prophylactic treatment of VM are based on the therapy guidelines for migraine.

In three retrospective cohort studies beta-blockers, valproic acid, topiramate, lamotrigine, clonazepam, amitriptyline and flunarizine have been shown to decrease the duration, intensity and frequency of episodic vertigo and its associated features (2, 3, 4).

In a retrospective, open-label study lamotrigine has been used and was found to decrease the frequency of the vertiginous episodes without a statistically significant effect on headache frequency (5).

Topiramate has been reported to be effective in reducing the frequency and the severity of vertigo and headache attacks (6).

Cinnarizine was tested in a retrospective, single-center, open-label investigation on VM showing reduction in the mean frequency of vertigo and also the mean frequency, duration, and intensity of migraine headaches per month (7).

In a study comparing flunarizine with betahistine and vestibular exercises (8) flunarizine was reported to decrease the frequency and severity of vertiginous episodes. However, frequency and severity of headache was not significantly different in the two treatment groups.

In a recent study acetazolamide was found effective in reducing both the frequency and severity of vertigo and headache attacks and this effect was more prominent for vertigo frequency and severity (9).

Vestibular rehabilitation training proved effective inVM patients as add-on treatment to medical therapy or as a standalone treatment option (10).

Multicenter randomized controlled treatment trials based on pathophysiology must be designed on the basis of the recently established diagnostic criteria.

References

1. Neuhauser H, Radtke A, von Brevern M, Lempert T (2003) Zolmitriptan for treatment of migrainous vertigo: a pilot randomized placebo-controlled trial. Neurology 60:882–883

Bikhazi P, Jackson C, Ruckenstein MJ (1997) Efficacy of antimigrainous therapy in the treatment of migraine-associated dizziness. Am J Otol 18: 350-354

3. Baier B, Winkenwerder E, Dieterich M (2009) "Vestibular migraine": effects of prophylactic therapy with various drugs. A retrospective study. J Neurol 256:436–442

4. Maione A (2006) Migraine-related vertigo: diagnostic criteria and prophylactic treatment. Laryngoscope 116:1782–1786

Bisdorff AR (2004) Treatment of migraine related vertigo with lamotrigine an observational study. Bull Soc SCi Med Grand Duche Luxemb 2: 103-108.

Gode S, Celebisoy N, Kirazli T, Akyuz A, Bilgen C, Karapolat H, Sirin H, Gokcay F (2010) Clinical Assessment of Topiramate Therapy in Patients With Migrainous Vertigo Headache Headache 50: 77-84

7. Taghdiri F, Togha M, Razeghi Jahromi S, Refaeian F (2014) Cinnarizine for the prophylaxis of migraine associated vertigo: a retrospective study. Springer Plus 3:231-235

8. Lepcha A, Amalanathan S, Augustine AM, Tyagi AK, Balraj A (2014) Flunarizine in the prophylaxis of migrainous vertigo: a randomized controlled trial. Eur Arch Otorhinolaryngol 271:2931–2936

9. Çelebisoy N, Gökçay F, Karahan C, Bilgen C, Kirazlı T, Karapolat H, Köse T (2016) Acetazolamide in vestibular migraine prophylaxis: a retrospective study. Eur Arch Otorhinolaryngol 273:2947-295

10. Vitkovic J, Winoto A, Rance G, Dowell R, Paine M (2013) Vestibular rehabilitation outcomes in patients with and without vestibular migraine. J Neurol 260:3039–3048

EPIDEMIOLOGY OF VESTIBULAR MIGRAINE

V. Rama Tharak Nath

Vestibular migraine (VM) is often under diagnosed and there fore under reported. This is because head ache is often absent during the attack and other features of Migraine are not inquired into by the physician. Both Migraine and Vertigo are common in general population . Migraine and Vertigo together in the same patient exceed the random chance of comorbidity

VM has a female to male ratio of 1.5 and 5 to 1. It has an autosomal dominant pattern of inheritance and there fore positive family history is not uncommon. Life time prevalence of VM was estimatedat0.98%. Prevalence of VM was 9% in a group of migraine clinic patients and 7% in a group of dizziness clinic patients each group comprising of 200 patients.

THE PHENOTYPES OF VESTIBULAR MIGRAINE

Teggi Roberto
San Raffaele Scientific Institute – Milano - Italy

The diagnosis of Vestibular Migraine mainly rely on symptoms. Among criteria, 5 episodes of vestibular symptoms of moderate severe intensity, lasting from 5 minutes to 72 hours are required to diagnose VM.

The "VM-Phenotypes project" is a questionnaire-based, multicentric study whose purpose is to assess phenotypes, accompanying symptoms, familial cases and presence of pediatric precursors in a large cohort of definite VM subjects. We report preliminary data on a sample of 252 patients. Age at inclusion was 45.78±13.57 [range 19-76]. Females were 214 (84.9%). Duration of vestibular symptoms was 52.8±67.2 months [range 2-360]. The first headache occurred at 22±9 yo, while the first vertigo at 37.5±12.9

The Barany grid was used to assess symptoms; multiple answers were possible.

Internal vertigo was reported by 73% of cases, 53.5% of them referred spinning; in 24.1% of these subjects vertigo presented a positional component, in 33.3% it was triggered by head motion. Dizziness was reported by 47.2% of patients. Vestibulo-visual symptoms (external vertigo) was referred by 25% of patients, while oscillopsia was reported as the main symptom in 10.7% of cases. Postural symptoms were referred by 61.5% of subjects, only in 3 cases patients referred fall.

Duration of vertigo spells was less than 5 minutes in 23%, between 6 and 60 minutes in 21.9%, 1-4 hours in 15.6%, 5-24 hours in 17.6%, days in 8.3%; moreover, 11.6% referred attacks lasting from minutes to hours, while 2% from minutes to 3 days.

Accompanying symptoms were, in order of frequency, nausea (89.6%) photophobia (43.3% sometimes; 44.4% always), phonophobia (31.7% sometimes; 38.9% always), vomiting (51.1% sometimes), tinnitus (sometimes 40.8%; always 10.7%), hearing loss (15% sometimes; 4% always), ear fullness (30.1% sometimes; 8.7% always).

In our sample, 73.1% referred a positive familiarity for headaches, while 66.2% for vertigo. When asked of the diagnosis of vertigo, in 26.2% of cases they were unable to specify it, in 21.4% they reported VM, in 8.7% BPPV, in 7.1% Menière's Disease, in 2.8% vestibular neuritis.

Among pediatric precursors, motion sickness was the most represented (42.8% of cases), followed by cyclic vomiting (9.5%), episodic abdominal pain (7.1%), episodic vertigo (4.8%) and torticollis (4.8%)

All 24 subjects referring cyclic vomiting in pediatric age also referred vomiting in most cases of vertigo attacks.

Tinnitus, fullness and sensation of hearing loss, which are more commonly reported in Menière's Disease attacks, are far from being rare in VM subjects. In the last part of the presentation, proposed diagnostic criteria and exams which may be useful to differentiate the 2 disorders will be discussed.

16:00-17:00

INVITED LECTURES

IMAGING OF INNER EAR AND THE ROLE OF ENDOLYMPHATIC HYDROPS IN ASSESSING MENIERE'S DISEASE

Pyykkö Ilmari, Nakashima Tsutomu, Zou Jing
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Objective: Symptom-based classification methods have been used to make the diagnosis of *Ménière's disease* (MD). Although recent modification of the assessment have been proposed, diagnosing MD is challenging and contains many pitfalls. The classification defines 'Possible MD, 'Probable MD, 'Definite MD and 'certain MD. The 'Certain MD' is diagnosed by the symptom entity and histological verification of *endolymphatic hydrops* (EH) in the inner ear. To define the condition clinically, however, the existing AAO-HNS classification is unhelpful. The recent development of 3T MRI with gadolinium chelate (GdC) as the contrast agent provides a tool for the visualization of EH. With the development of inner ear imaging, the diagnostic work-up can be performed even in patients with early development of symptoms. The purpose of the present study was to evaluate development of symptom complex in MD and study with 3T MRI the EH in different diagnostic classes.

Method: We assessed the symptom entity of 740 patients belonging to Finnish Menière association. The mean age of patients with MD was 62.3 years (SD 11.5 years). Their duration of the MD had lasted an average of 16.2 years (SD 11.2 years). We used 3T MRI to image EH in the inner ear with GdC containg contrast agent (either transtympanic or intravenously administered GdC) among 224 patients. Overall, 328 ears were evaluated. MRI was performed 24 hours after the transtympanic injection of GdC. An intravenous application of 0.2 ml/kg was used in 105 patients (210 ears) and MRI was performed 4 hours after the intravenous GdC administration. For imaging, specific algorithms using Fluid Attenuation Inversion Recovery sequences (FLAIR) can demonstrate minute amounts of contrast agent in the inner ear.

Results: In onset of the first symptoms only 38 % of the patients had the symptom triad at clinical entry, permitting a clinical diagnosis of a definite MD. The mean age of onset of first symptom was 43.8 years, with about 10 % of the patients being older than 65 years. The time delay between hearing loss and vertigo was more than five years in 20 % of the patients. Gadolinium contrasted MRI demonstrated EH that was present in 190 out of 205 ears (93%) with symptoms attributable to MD (both transtympanic and intravenously administred GdC). The vestibule demonstrated EH more frequently than did the cochlea ($p<0.004$). In patients with unilateral symptoms 75 % the EH was bilateral. Patients with a single inner ear symptom such as vertigo, fluctuant hearing loss, or tinnitus and classified of either possible or probable MD, comprised a heterogeneous group on MRI findings. 53 % of patients with sudden hearing loss showed EH. 69% to 95% of the other patient groups with single symptom had EH.

Conclusions: The cardinal symptoms of MD occurs initially only among 38% of the patients. In 20 per cent of the patients the development of complete symptom complex will take more than 5 years and comprises a continuum from a mono-symptomatic disease to the typical symptom complex of MD. With 3T MRI EH can be visualized even in possible or probable MD. Interestingly, unilateral MD shows often bilateral EH. We suggest that a 3T-MRI measurement should be carried out in patients with sensorineural hearing loss, vertigo, and tinnitus to verify the inner ear pathology. The terms *vestibular MD, cochlear MD* used in mono-symptomatic patients *and MD* in patients with complete symptom entity should be replaced with term *Hydropic Inner Ear Disease*. Early assessment with 3T MRI provides diagnosis of *'certain MD'* for the patient and can lead to better management of the condition.

Keywords: Ménière's disease, Endolymphatic hydrops, Visualization of inner ear, 3T MRI, terminology

VIRAL AETIOLOGY OF MENIERE'S DISEASE AND THE LACK OF AN IMMUNE RESPONSE IN SUFFERERS

William Gibson

17:00-18:30

PLENARY - DRUG PERFUSION TO THE INNER EAR

INTRATYMPANIC GENTAMYCIN FOR THE TREATMENT OF MÉNIÈRE'S DISEASE

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Ménière's disease (MD) is a chronic disease that is characterized by intermittent episodes of vertigo lasting from minutes to hours, fluctuating sensorineural hearing loss, tinnitus and sensation of aural fullness. Indeed, vertigo is the main complaint of the patients with MD. Ménière's disease may negatively affect quality of life of the patients and their families. Unfortunately, there is currently no cure or causal therapy. However, patients can be helped with different treatment modalities.

As a matter of fact, vertigo attacks can be treated medically. In spite of lacking a universally accepted attack treatment protocol, vestibular-suppressive treatment is generally used and combined with corticosteroids and anti-emetics, if necessary. In literature,there is no debate or controversy about attack treatment of MD. Main topic for the treatment of MD focusing on prophylactic treatment for the attacks as well as causative treatment of MD.

The aim of the modern prophylactic treatment is to reduce the frequency and severity of symptoms and improve the quality of life. The treatment modalities are counselling, preventive measures and life style adaptation, drug therapy, tinnitus control, hearing devices, and sometimes surgery.

Recently, intratympanic treatment of MD is popularized; because it is moderately invasive, safer, simple, and well tolerated. The target of this treatment is hair cells of the vestibular end-organs in crista of the semicircular canals and macula of the saccule and utricle. Basically, corticosteroids and aminoglycosides are used for this treatment. Gentamicin is the most popular aminoglycoside; because of its higher vestibulotoxic effect; thereby it may give an advantage to destruct the vestibular sensory structures while keeping cochlear hair cells intact. Different protocols such as titration method, interval therapy, single-shot therapy, variable titration method, and on-demand method have been evolved from heavy chemical labyrinthectomy for intratympanic gentamicin treatment.

Fifty-one patients with MD have been treated with intratympanic gentamicin in outpatient procedures. Patients selection criteria were being sure about correct diagnosis, history of Ménière's Disease lasted for more than a year, no benefit with non-invasive conservative treatment, life style adaptations, low salt diet, and medicines (diuretics, betahistine, etc.), average hearing threshold >35 dB, willing patients who gave their informed consent for this treatment and unilaterality. The exclusion criteria were unwilling patients who refused their informed consent for this treatment method, uncooperative patient when intratympanic steroid treatment, bilaterality, and good hearing.

Gentamicin was given by transtympanic injection on the anterior inferior quadrant by a 22G dental needle under microscopic view without any anaesthesia while the patient lying in supine position and the face turned to the opposite side. Before the injection, a puncture was created on the anterior superior quadrant with the same needle without any injection to give a way to the ear in the middle ear come out during the injection. 0.4 ml gentamicin was given slowly and then turned the patient's face up while the patient maintains the supine position for 10-15 minutes. Finally, the patient was instructed to avoid swallowing, talking, yawning, ear tampering, or nose blowing.

The evaluation of effectiveness is performed on the basis of symptoms relief after intratympanic injections, as well as evaluation of audiometric and cVEMP, ENG/VNG data. Satisfactory vertigo control was determined in 82% of the patients. In general terms, major/minor complications of this treatment are infection, dizziness, vertigo, sensorineural hearing loss, conductive hearing loss, and tympanic perforation; howeveronly few minor complications were seen except sensorineural hearing loss in some cases.

As a conclusion, intratympanic gentamicin treatment was highly effective for vertigo control in patients with MD. However, the its effects on tinnitus and aural fullness were variable. Its negative effects on hearing thresholds and speech discrimination scores were at clinically negligible level when two of the cases were ignored.

Keywords: Ménière's disease, Gentamicin, Aminoglycosides, Intratympanic injection

ENDPOINT INDICATORS OF LOW-DOSE INTRATYMPANIC GENTAMICIN FOR MÉNIÈRE'S DISEASE

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The low-dose intratympanic gentamicin (ITG) injection is applied to treat unilateral intractable Ménière's disease (MD) with high efficiency and hearing preservation. The present study is to explore endpoint indicators of low-dose ITG treatment in unilateral intractable MD. Patients with unilateral intractable MD at a single institution were retrospectively reviewed from June 2012 to March 2014. The symptoms, head thrust test (HTT), vestibular evoked myogenic potentials (VEMPs) test and pure tone audiometry (PTA) at pre-injection and third week of post injection were evaluated in all patients. Single-shot ITG (0.3-0.5 ml) at a concentration of 30 mg/ml was administered to all patients. The sensitivity and specificity of HTT, VEMPs and PTA for vertigo control were measured in unilateral intractable MD patients.

All 37 patients with a median follow up of 19 months were included. 24 patients (64.9%) obtained class A vertigo control and 7 patients (18.9%) obtained class B vertigo control. Only 6 patients had class C control (16.2%). Based on the four-tone average thresholds at 0.5, 1, 2, and 3 kHz, 78.4% patients had no significant change in PTA and 16.2% patients experienced significant improvement. Only 5.4% patients had deterioration in PTA. The sensitivity and specificity of HTT for vertigo control after ITG treatment was 74.2% and 50.0%. While, the sensitivity and specificity of VEMP threshold was 83.9% and 33.3%. The sensitivity and specificity of PTA was 3.2% and 66.7%. When combined HTT, VEMPs and PTA, sensitivity and specificity for vertigo control was 93.5% and 83.3%.

Conclusions: One-shot, low-dose ITG treatment proved to be effective and safe for patients with MD. HTT, VEMPs and PTA could be used as endpoint indicators for MD patients received ITG treatment.

Key words: Intractable Ménière's disease; Vertigo; Withdrawal; Intratympanic Gentamicin injection.

Acknowledgements: This study was supported by the 973 project (2011CB504504 [C. F. D]) and the National Natural Science Foundation (No. 81070785, 81170909 [C. F. D.]).

DRUG DELIVERY TO THE INNER EAR USING A DEXAMETHASONE-ELUTING ELECTRODE

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Objectives: The aim of the study is to compare the effects of a Dexamethasone-Eluting Electrode vs a conventional electrode array after cochlear implantation in *Macaca fascicularis*.

Methods: After ethical committee approval, fully functional Cochlear Implants with the Dexamethasone-Eluting Electrode were unilaterally implanted in five normal hearing *M. fascicularis* (RW insertion) for six months. The control group consisted of five subjects with a conventional CI. After light sedation, impedance and auditory nerve response (eCAP) were recorded through at two weeks and subsequently after each full month post-op up to six months. ABR was recorded using click and burst tone in contralateral and ipsilateral sides (1-16 kHz). After sacrifice, temporal bones are processed. Paraffin embedded and masson trichrome staining is performed. Tissue reaction is quantified.

Results: For the amplitude growth function (AGF) eCAP at 800 cu stimulation, a significantly higher response was observed for the DEX group in comparison with the control group. The average impedance at the electrode contacts in the DEX group was more than 50% lower than in the control group. Click tone thresholds were approx. 40 dB for both groups before implantation. Implantation caused a 40 dB hearing loss (HL) in the DEX group and an 80 dB HL in the control group. Histological findings show a significant difference between both groups regarding fibrotic reaction and intra-cochlear damage.

Conclusion: The results in M. fascicularis are encouraging towards development of drug-loaded CIs. DEX appears to protect the neural population which is indicated by an improved neural response. Next to enhanced hearing preservation, significantly lower impedances for the DEX vs. control group are important benefits to the patient in terms of fitting dynamics and battery lifetime but will become an indispensable development e.g. for fully implantable cochlear implants in the future. Histology demonstrates the effect of dexamethasone on tissue and bony growth post-implantation.

March 4th – Grand Ballroom I

08:00-09:00

HOW I DO IT - BPPV TREATMENT

BPPV TREATMENT. HOW I DO IT. MARIGNANE-FRANCE

Thomas Richard-Vitton
Clinique

Free floating particles involving one or more semi-circular canals is the most common cause of balance disorders. Canalithiasis are supposed to provoke some BPPV but some recent studies shown that some of them could lead to balance disorders without positional vertigo. Particles involving lateral canals could be under-reported and to be responsible of a large part of the non-BPPV canalithiasis, sometimes secondary to a classic PC-BPPV treatment with misdiagnosed combined lateral involvement. This session will expose how to diagnose and to treat each type of canalithiasis.

A new therapeutic maneuver using a mechanical assistance and permitting to treat both apogeotropic and geotropic form of LC-BPPV will be proposed.

A prospective study selected 520 subjects along one year, who presented with some positional vertigo or unsteadiness. These

dizzy patients, who presented with positional nystagmus typical from lateral canalithiasis, were included: three hundred thirty-two women and 188 men, ranged from 12 to 94 years old with an average of 58. Their history began from 2 days to 1 year ago, with an average of 40 days, before the first therapeutic session.

The TRV armchair allows rotation of patients wearing infrared video goggles, with both eyes hidden, in all semi-circular planes for 360° or more. An abutment with shocks absorber permits to briskly smoothly stop the rotation of the horizontal rotation (pitch plane equivalent) of the chair when the patient becomes horizontalized. The analysis of the positional nystagmus in the total darkness permits to have a better detection of the horizontal component that is very sensitive to the fixation. The maneuver consists to make 7 series of 12 smooth shocks on the shock absorber placing prior the involved ear toward the floor, nose turned at 90° from the ceiling, in supine position. Each series is made after a 45° more rotation toward the safe side to make the seventh position nose down the floor. It will permit a 270° rotation that will place progressively the lateral canal from the cupula toward the floor to stoma of the canal toward the floor in six steps. These series of shocks permit to give to the very little particles, that are to light to progress thanks to the gravity, some hypergravity that helps them to move toward the exit of the canal.

The patient was considered as cured if there was an absence of symptoms or findings 7 days later. In case of residual dizziness, repeat therapeutic sessions were performed or patients benefit further vestibular examination and sometime MRI.

Four hundred seventy-five of the 520 patients (91.3 %) were totally freed of symptoms with one session. The horizontal component was apogeotropic in 355 patients (68.3%), and 27 patients present a bilateral involvement treated with an average of four sessions. The apogeotropic form didn't need more session than the geotropic form. The dynamic therapeutic maneuvers seem to significantly improve the therapeutics' success of LC-BPPV management especially if it is an apogeotropic form which is regularly difficult to cure.

The treatment of the lateral involvement is certainly the more difficult of all. The lack of efficacy could produce some persistent unsteadiness or drunkenness sensations which could also occur after a therapeutic maneuver for PC-BPPV because of a misdiagnosed combined lateral involvement. Often considered as a post-BPPV otolithic syndrome, this could be a residual lateral canalithiasis linked to a very few otoliths in the canal and could be successfully treated with this new maneuver. This technic permits to improve the management of canalithiasis, especially those involving the horizontal canals. The management of the canaliths disorders need to make a complete analysis of the positional nystagmus to not to miss the frequent combination of locations. This will lead to treat each canal and to solve all the troubles.

11:00-13:00

INVITED LECTURE - AN UPDATE ON VESTIBULAR REHABILITATION

Susan Whitney

In this session, the participant will be exposed to the latest advancements and evidence related to best practice for the rehabilitation of persons with balance and vestibular disorders. Evidence from recent randomized controlled trials, Cochrane reviews and clinical practice guidelines will be provided. In addition, new innovations will be shared to improve the understanding of how physiotherapists treat persons with balance and vestibular disorders. Diagnoses and clinical characteristics that promote optimal recovery and co-morbidities that negatively affect recovery will also be shared.

DEBATE - COMORBIDITIES IN MENIERE'S DISEASE

COMORBIDITIES OR CLINICAL SUBGROUPS IN MENIERE DISEASE?

Jose A. Lopez-Escamez[1,2] and Lidia Frejo[1] on behalf of Meniere disease Consortium

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Meniere's disease (MD) is a chronic multifactorial disorder of the inner ear characterized by episodes of spontaneous vertigo, with fluctuating low-to-medium frequency sensorineural hearing loss (SNHL), tinnitus and aural fullness. Some comorbidities, such as migraine or autoimmune disorders (AD), have been associated with MD in epidemiological studies. To determine the relevance of comorbidities in MD, we conducted a cluster analysis in patients with unilateral Meniere disease (MD) and to compare them with the clinical subgroups found in bilateral MD in a cross-sectional multicenter study including 988 adult patients with unilateral MD. We established five clusters in unilateral MD. Group 1 is the most frequently found, includes 53% of patients, and it is defined as the sporadic, classic MD without migraine and without autoimmune disorder (AD). Group 2 is found in 8% of patients, and it is defined by hearing loss, which antedates the vertigo episodes by months or years (delayed MD), without migraine or AD in most of cases. Group 3 involves 13% of patients, and it is considered familial MD, while group 4, which includes 15% of patients, is linked to the presence of migraine in all cases. Group 5 is found in 11% of patients and is defined by a comorbid AD. We found significant differences in the distribution of AD in clusters 3, 4 and 5 between patients with uni and bilateral MD. Conclusions: Cluster analysis defines five clinical subgroups in MD and it extends the phenotype beyond audiovestibular symptoms. This classification will help to improve

the phenotyping in MD and facilitate the selection of patients for randomized clinical trials.

14:00-15:30

DEBATE - PERILYMPH FISTULA

Marco Mandalà
University of Siena

Perilymphatic fistula is a rare condition in which an abnormal communication is present between the perilymphatic space of the inner ear and the middle ear or mastoid. The manifestations of this disease vary in severity and complexity ranging from hearing loss, tinnitus, aural fullness, vertigo, disequilibrium, or a combination of these symptoms.

Malformative, idiopathic and iatrogenic cases of perilymphatic fistula will be presented and discussed with special emphasis of diagnosis both from clinical and instrumental point of views.

Surgical and medical treatments adopted will be presented with videos and vestibular/audiological outcomes.

DIVING-INDUCED INNER EAR BAROTRAUMA / PERILYMPHATIC FISTULA

Avi Shupak[1,2]
Unit of Otoneurology, Carmel and Lin Medical Centers[1]; Bruce Rappaport Faculty of Medicine the Technion, Haifa, Israel[2]

Objective: To report the author's experience with the long-term follow-up of patients with diving-related inner ear barotrauma / perilymph fistula and to discuss residual cochlear and vestibular damage in relation to the question of fitness to dive.

Design: Retrospective consecutive case series.

Methods: Nine recreational divers with inner ear barotrauma (IEB) were evaluated and followed. A complete otoneurological physical examination and laboratory evaluation were carried out. The latter included audiometry, electronystagmography, a rotatory chair test using the sinusoidal harmonic acceleration protocol, and computerized dynamic posturography.

Results: Four of the IEB events involved breath-hold diving of short duration. The average depth and bottom time of the five scuba dives resulting in IEB were 13+ 6.3 meters and 26.3+8.9 minutes, respectively. 8 patients suffered from vestibular insult, while 5 had hearing loss. In 4 cases moderate or severe sensorineural hearing loss was presented while the remaining patient suffered from moderate mixed hearing loss.

IEB was primarily treated by complete bed rest with the head elevated. Exploratory tympanotomy and patching of the round and oval windows were required in two patients who had hearing deterioration and continuous severe vertigo. The average follow-up period was 28.4 months (range, 1–72; median 19 months). 3 patients recovered completely within 1 month of the diving accident. Residual cochleovestibular deficits were found in 3 (33%) of the patients. 1 patient had asymptomatic vestibulopathy and all 3 had sensorineural hearing loss, 1 moderate and 2 severe, one of which accompanied by bothersome tinnitus.

Conclusion: Conservative treatment of IEB, which limited explorative tympanotomy to patients whose inner ear function deteriorated during complete bed rest, was associated with complete recovery in 67% of cases. Any decision regarding fitness to dive after IEB should be based on the findings of a complete otoneurological evaluation, even in the completely asymptomatic patient. Although residual hearing loss does not in itself represent a risk to diver safety, the significance of a vestibular deficit should be taken into consideration in the context of the sensory deprivation that may be anticipated in the underwater environment and the complexity of the dive.

16:00-17:00

INVITED LECTURES

A NEW THEORY FOR MENIERE'S DISEASE: DETACHED SACCULAR OTOCONIA

Pubmed cites 7600 publications on Meniere's disease since 1863, yet its true cause remains enigmatic. Conventional theories on its pathophysiology include an anatomical variation in the size or positional of the endolymphatic sac and duct, a viral infection or autoimmune process involving the sac, or a genetically determined abnormality of endolymph control. Since 1963 the predominant theory on the mechanism of vertigo attacks has been endolymph compartment rupture and "potassium intoxication" of perilymph. There is now considerable evidence that they are explained by hydrostatic flow of endolymph rather than a rupture.

It is now well accepted that detached urtricular otoconia are the cause of benign paroxysmal positional vertigo (BPPV), but it is seldom asked what is the fate of the saccular otoconia? Animal studies on blocking the ductus reuniens and endolymphatic duct have produced hydrops in the cochlea, saccule and utricle[1]. 3D cone bean CT images in Meniere's ears show a similar pattern with apparent obstruction of the of the ductus reuniens, saccula duct and endolymphatic sinus, suggesting obliteration is a characteristic image finding in Meniere's disease [2].

There is a very close correlation between age of onset for Meniere's disease, being rare in children, occasional in teenagers, and increasing in prevalence from the the age of twenty years, most between 30 and 60 years, with an onset of older than 60 in approximately one third of patients. This raises the possibility that BPPV and Meniere's disease might have the same cause[3]. If true, unfortunately the simple logical repositioning treatments for BPPV are unlikely to be effective.

[1] Kimura RS, Schuknecht HF, Ota C, Jones DD. Obliteration of the ductus reuniens. Acta Otolaryngol 1980; 89: 295-309.

[2] Yamane H, Sunami K, Shiiguchi H, Sakamoto H, Imoto H, Rask-Andersen H. Assessment of Meniere's disease from a radiological aspect—saccular otoconia as a cause of Meniere's disease? Acta Otolaryngol 2012; 132: 1054-1060.

[3] Hornibrook J, Bird P. A new theory for Meniere's disease: detached saccular otoconia. Otolarygol Head Neck Surg in press DOI: 10.1177/0194599816675843

March 4th – Grand Salon I-II-III

08:00-09:00

HOW I DO IT - VESTIBULAR NEURECTOMY

Jacques Magnan
University Aix- Marseille (F)

How to do safely : Minimally invasive retrosigmod approach is the routine procedure. Retrolabyrinthine approach can be an alternative for « diplomatic reasons » . Both will be described in details.

How it's work : vestibular compensation evidences.,

When : Incapacitating vertigo will be defined.

Results : short and long term . Until we have not specific treatment in Meniere's disease, vestibular neurotomy offers the highest pourcentage of success regarding vertigo, hearing preservation and bilaterality prevention.

14:00-15:30

INVITED LECTURES

DIZZINESS AND HYPERTENSION

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Dizziness is met in 22,9% of German population and related to vestibular dysfunctions. Among frequent comorbid health problems they name hypertension. So, studying of dizziness correlations with hypertension is the problem of our presentation. As 26-28 May 2016 43d Congress of Neurootological and Equilibriometric Society, Budapest, Hungary accepted "International Clinical Protocol on Vestibular Disorders (Dizziness)" we have used it for studies of interactions of vestibular disorders with hypertension.

Material Results of examination of 996 persons are presented, 70 of them being healthy volunteers. 273 Chornobyl clean-uppers (CCU) studied during the year of 1986. During 1991-1996 we have monitored 530 CCU. Additionally 123 Kyïv citizens complaining of dizziness have been examined.

CCU monitoring in 1986. During clean-up CCU reported dizziness episodes. Disequilibria was documented while CCU examination in May-September 1986. As a critical borderline, 5-score from 20-point of coordination battery being selected. Among those, who already visited the radioactivity zone, more than 5 points was recorded in 37,01%. Out of the naïve persons more than 5 points was recorded in 14,53% persons. For those, who have already radiation experience coordination impairment was 4,14±2,73, while for naïve – 2,00±2,624 points.

Monitoring in 1991-1995. Fact of symptom start in 1988 indicates the period of imaginable wellbeing lasted two years. Among the persons examined dizziness was dominating symptom with expression of I_e=3,75.. Considering the dizziness expression of I_e =3,1 in 1992, the initial period of delayed consequences being missed both by doctors and patients.

Vestibulo-sensory disturbance dynamics was instrumentally documented by Vestibular evoked potentials (VestEP, not VEMP). In 1991 statistically significant increase of latent period (LP) of P_1 (P_1=40,42±16,89 ms, control 30,8±14,1 ms, p<0,05. Parameter change was identified as dynamic coefficient (C_d). Normative value of LP VestEP was estimated as reference. Year changes of C_d for LP VestEP appeared to be the next: 1991 – C_d=29,87%, 1992 – C_d=36,36%, 1993 – C_d=62,34%, 1994 – C_d=94,81% and 1995 – C_d=78,57%.

N_1 is the most stable and least variable; thus making it the most significant parameter. In 1991 it LP reached 89,74±17,95 ms, greater than normative data 68,6±18,4 ms. In 1992 change become statistically significant according to F-test.

In 1991-1993 progressive increase of LP P_2 VestEP was revealed. In 1994 and 1995 increase of the latency of P_2 peak become statistically significant p<0,05.

Vestibulo-vegetative projection.

In 1992 I_e for vegetative complaints became 2,1, in 1994 – it reached its maximum value of 2,7. Blood pressure (BP) increased progressively through the years of monitoring, achieving its maximum in 1994-1995. Systolic blood pressure (SBP) has been 114,91±17,04 in 1991, in 1994-95 increased to 138,44±23,83 mm Hg. The difference between the data obtained in 1991 and in 1994-95 reached statistical significance (p=0,05), though not reached critical 140|90 mm Hg. Dynamics of DBP and pulse rate exactly followed the SBP dynamics.

123 patients complaining of dizziness were examined. BP in control group was 118,38±12,14/76,19±8,53 mm Hg, in hypertensive - 148,98±19,76/94,44±7,83 (difference significance for SBP: F-test p=0,00039, T-test p=2,56E-15, DBP F-test p=0,53, T-test p=1,05E-21, C_d were correspondingly 25,85% and 23,95%). Difference profile between groups was: dizziness 46,05%|76,92%, giddiness 22,37%|34,62%, kinetosis 26,32%|34,62%, nyctophobia 19,74%|28,95%, optokinesis 18,42%|25,00%. Romberg test performance with eyes closed increased the sway square in the hypertensive group from 0,08±0,05 to 0,34±1,00 m^2 C_d =325,00% with significance F-test p=1,89E-24, and T-test p=0,18; indicating the importance of sway square studies in hypertension. Great levels of C_d for vestibular dysfunctions parameters are possible if primary lesion is localized in vestibular nuclei. The sensitivity of just F-test indicates the appearance of new quality – hypertension, initiated by vestibular dysfunction.

Key words: dizziness, vertigo, hypertension

16:00-17:00

SHORT REPORTS

TONE BURST ELECTROCOCHLEOGRAPHY FOR THE DIAGNOSIS OF MENIERE'S DISEASE

Jeremy Hornibrook

That cochlear endolymphatic hydrops could be ascertained to support a diagnosis of Menieres' disease arose by a publication

by Gibson and colleagues in 1977. Using transtympanic electrocochleography (EcochG) they claimed that an enlarged direct current component of the click stimulus action potential (AC) could be an indication of cochlear hydrops. This was confirmed by Coates and colleagues which led to numerous publications using SP/AP ratios of of 0.33 to 0.35 and to an eventual disenchantment as to the reliability of the test, further compounded by audiologists using remote canal or eardrum electrodes which give responses approximately one tenth of the magnitude of those achieved by direct contact with the cochlea. Subsequently Gibson, by comparing click response SP/AP ratios with ears of comparable hearing instead of Meniere's opposite ears, retracted this claim unless the SP/AP ratio reaches a severe criterion of 0.5.

Meanwhile Gibson had employed tone bursts, giving the test a significantly higher sensitivity and specificity of about 90%. It cannot be achieved using a remote eardrum for canal electrode. Nonetheless click stimulus EcochG continues to be employed as a diagnostic test for Meniere's disease despite the evidence that it should be abandoned[1].

We have used tone burst EcochG to diagnose hydrops to confirm diagnosis of Meniere's disease ("clinically certain" Meniere's disease) as the basis of several studies. The recent advent of MRI inner ear imaging has predictably inspired studies comparing it sensitivity with that of EcochG. In our hands tone burst EcochG was far more sensitive that MRI innear ear imaging for detecting cochlear hydrops. Images and conclusions from MRI seem to be confounded by variables such as scanner brand, head coil specifications, and the possibility that gadolinium entry may be uneven and favour the vestibule. In our hands transtympanic tone burst EcochG is the most simple, cheap and sensitive test for detecting cochlear hydrops to confirm diagnosis of Meniere's disease.

The new internationally agreed Barany Society diagnostic definition of Meniere disease with only two categories (probable and possible) will lead to significant underdiagnosis. So there is an urgent need for agreement and standardisation of tests for hydrops which can allow a "clinically certain" diagnosis of Meniere's disease such that what is now "definite" is what was previously called "certain" from a post-mortem.

[1] Hornibrook J, Bird P, Flook E, O'Beirne GA. Electrocochleography for the diagnosis of Meniere's disease—The wrong stimulus. Otology&Neurotology 2016; 37; 1677-1678.

COMPARISON OF TREATMENT OUTCOMES OF POSTERIOR CANAL BENIGN PAROXYSMAL POSITIONAL VERTIGO BETWEEN SINGLE AND MULTIPLE CYCLES OF CANALITH REPOSITIONING PROCEDURE: A PRELIMINARY STUDY

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Department of Otolaryngology, Faculty of Medicine, Chiang Mai University

Objective: To compare the treatment outcomes of posterior canal benign paroxysmal positional vertigo (PSC BPPV) between single and multiple cycles of canalith repositioning procedure (CRP)

Materials-Methods: Randomized controlled trial recruited patient greater than 15 year-old with history of repeated brief episodes of positioning vertigo, and positive Dix-Hallpike test (DHT) visited at ENT clinic, Chiang Mai University hospital between February 2016 and October 2016.

Results: There were 40 patients, 14 males and 26 females. Patients' characteristics between "single CRP" and "multiple CRP" groups including age (59 and 62 years), female: male ratio (14:7 and 12:7), vertigo symptoms, position aggravated vertigo symptoms, episodes of vertigo, latency and duration of nystagmus in DHT, causes of BPPV, affected side (right:left = 12:9 and 12:7), and dizziness handicap inventory score (DHI) showed no difference. No difference in treatment outcomes was showed between "single CRP" and "multiple CRP" groups in the 1st and the 4th week; including 1) rate of negative DHT (81% and 78.9%, p-value = 0.999; 90.5% and 89.5%, p-value = 0.999), 2) DHI score (p-value = 0.887 and 0.260), 3) rate of symptom improvement (p-value = 0.219 and 0.999) 4) balance impairment level (p-value = 0.173 and 0.999), 5) complication rate (p-value = 0.999 and 0.999). Complication rate on the 1stvisit in single CRP group (0%) was lower than in multiple CRP group (15.8%), but no significant difference, p-value =0.098.

March 4th – Mahogany

11:00-13:00

FREE PAPERS

JULIUS EWALD--THE MAN AND HIS FAMOUS BOOK

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In1824 Marie Jean Pierre Flourens had published the results of of his experiments on pigeons which showed that the semicircular canals were associated with head and eye movements.

Julius Ewald (1855-1921) was Professor of Physiology at the University of Strassbourg (now Strousberg). His work on the inner ears of frogs, pigeons and dogs was published as "Physiologische Untersuchungen uber das Endorgan des Nervus Octavus" in 1892. Although the book is widely referred to by vestibular system investigators few have ever seen it.

A short bigraphy of Ewald is presented. A full English translation of the book was accomplished. Much of the book deals with ablative experiments on pigeon inner ears, but it conveys Ewald's ingenuity in experiment and equipment design, long before the operating microscope. The most elegant and important findings are not until page 264 as Experiment 81 and 82. Selective cannulation of the canals enabled the application of positive and negative pressures. These correctly implied a direct connection between the eye muscles except to the lateral rectus, which was the only error.

Ewald's important but perfunctory description of eye movements has become to be known as Ewald's Laws of Canal

Function. At the time some inconsistencies were perplexing (Ewald's Paradox) and were not explained for another 60 years by the electron microscope. Ewald's observations have become a quoted cornerstone of vestibular physiology and are now clinically relevant in explaining the eye movements of BPPV.

DIAGNOSTIC ROLE OF VIDEO HEAD IMPULSE TEST IN ADULT PATIENTS WITH VESTIBULAR DISORDERS

Mario Milkov[1], **Stefan Mirchev**[2]
[1]*Medical University "Prof. P.Stoyanov" Varna*
[2]*Medical University of Pleven*

The video head impulse test (vHIT) is a new technology that applies a high speed, lightweight video goggle to measure eye velocity and record 'catch up' saccades and other abnormalities in patients with dysfunction of the vestibular ocular reflex thus providing a quick and objective measure of the response of this reflex to head movements in dizzy patients in relation to a vestibular disorder.

We have reviewed the recent publications dealing with the clinical applications of vHIT in adult patients.

Usage of vHIT demonstrates that the occurrence of saccades in 25 subjects following cochlear implant surgery is more reliable than the gain value in the evaluation of the vestibular function. Interpretation of vHIT results should first depend on the occurrence of saccades and second on the gain value.

The examination of 24 patients with unilateral peripheral vestibular deficit by using the dynamic visual acuity (DVA) test and vHIT establishes a correlation between the compensatory covert saccades in vHIT and the improved performance of DVA-testing. DVA performance on the affected side is significantly better in patients with higher covert saccade percentage and lower cumulative overt saccade amplitude 20 This paresis can be predicted from the ipsilesional and contralesional vHIT gains but tumor size - from the ipsilesional vHIT gain and canal paresis.

Within a prospective cross-sectional study of 324 dizziness patients at a mean age of 53±17 years, the diagnostic values of caloric testing and dichotomous vHIT are compared. There is an abnormal vHIT gain in 39 patients and an abnormal caloric test in 113 ones. The sensitivity, specificity, positive predictive value and negative predictive value of vHIT are 31% (23-40%), 98% (95-99%), 88% (74-95%), and 73% (67-77%), respectively.

High vHIT positive predictive value indicates a strong relation of the abnormal vHIT to an abnormal caloric test result when determining the vestibular hypofunction in dizzy patients. The effects of head position (0° and 30° downward pitch) on gain values during vHITs are studied in 20 healthy controls and 18 patients with unilateral vestibular loss. In the patients, the mean gains on the diseased side are 0.92±0.16 in the head-up position and 0.82±0.2 in the head-down position.

This vHIT modification contributes to a more precise vestibular function evaluation and false-negative findings' reduction. In a retrospective chart analysis of 81 patients with vestibular migraine, the results from vHIT, caloric test, vestibular-evoked myogenic potentials, and sensory organization test are compared.

Initially, nine out of 81 patients present with abnormal vHIT, 14 of 73 patients do with abnormal caloric test, 25 of 65 patients - with abnormal sensory organization test, eight of 75patients - with abnormal cervical, and 20 of 75 patients - with abnormal ocular vestibular-evoked myogenic potentials.

Abnormal vHIT and caloric test results reveal semicircular canal dysfunction in vestibular migraine. At six months, abnormal vHIT gain and abnormal caloric results are significantly related to the necessity for continued medication. It is obvious that vHIT presents with a significant diagnostic value and should, therefore, find a much broader application in basic and clinical vestibulogy.

CONSERVATIVE THERAPY FOR TINNITUS WHICH MAY HAVE ORIGINATED FROM NEUROVASCULAR COMPRESSION IN 523 PATIENTS

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[3]*Takashi Matsushima, Department of Neurology, Juntendo Medical University, School of Medicine, Tokyo, Japan*

Vascular compression of the auditory nerve could cause some types of tinnitus such as pulsatile or imitative sounds. Imaging study could show relationships between the vessels and the nerve and not always show the function of the nerve. The study costs expensive. Imitative sounds may be ascribed to Neurovascular Compression (NVC). The aim of this study is to show effectiveness of our treatment on tinnitus probably caused by NVC.

6472 tinnitus patients examined from July 2008 to January 2015 were treated once a week by autogenic training, life style intervention, intravenous injection of VB12 and external electrical treatment. Details of treatment were reported in International Tinnitus Journal of vol. 20. Briefly a sinusoidal wave of about 10kHz with the intensity of about less than 2 mA was delivered to the acupuncture points in front of ears for an hour. In addition to external electrical stimulation, patients were instructed to practice autogenic training. Among these patients there were 523 subjects to imitative sounds. An evaluation of the outcomes for the tinnitus therapy was performed at less than 3 months.

191 patients (37%) experienced complete relief, 262 patients (50%) partial relief, and 70 patients (13%) no relief. The rate of relief for high tone tinnitus was poorer than for low and middle tones ($p=0.003$, $p=0.045$). There was more improvement in hearing loss in patients with lower tone tinnitus ($p=0.0002$). Among the factors affecting the outcomes, the tinnitus intensity where complete relief was achieved was lower than that for patients achieving partial relief or no relief ($p=0.002$, $p=0.002$) and the tinnitus intensity in patients achieving improvements in hearing was lower than in patients who did not improve ($p=0.007$). The improvement in hearing was associated with relief in tinnitus ($p<0.0001$).

This study suggests that therapy incorporating a number of approaches would be advantageous for tinnitus treatment.

AN OBJECTIVE ANALYSIS OF VHIT IN COMPARISON TO ENG FOR EVALUATION OF VESTIBULAR SYSTEM

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Introduction: Caloric test and later the electronystagmography has been the only investigation that for long provided a window into the vestibular system. However newer strides in this area in the form of VNG, VEMP and VHIT have now opened up the vestibular system to much comprehensive analysis. VHIT is a relatively new system to analyse the vestibular system. It separately tests each semicircular canal and can also differentiate between a superior and inferior vestibular nerve lesion.

Material-Method: This is an ongoing study started in January 2015 in the vertigo clinic, Nightingale Hospital, and till date 200 patients have undergone both VHIT and ENG and the data collected have been analyzed to ascertain how VHIT compares to ENG.

Result and observation: Of the 200 patients tested, 197 had some findings and only 3 had no finding in either ENG or VHIT. There were 48 patients that showed normal ENG but had different levels of VHIT findings. Another 33 patients on the other hand had normal VHIT but abnormal ENG.

Conclusion: VHIT can definitely pick up vestibular anomaly as well as if not better than ENG, especially lesions involving the anterior and posterior canals. Even some multi canal involvement escaped ENG monitoring but was picked up by VHIT.

BPPV- WHERE WE STAND

Sandeep Kumar
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Although we have made considerable progress in understanding and managing BPPV-most common cause of vertigo, still a number of questions remain unanswered and cases unexplained.

Here I will like to discuss some such issues like PC-CUPULOLITHIASIS, cases unresponsive to various Particle Repositioning Maneuvers, AC-BPPV, why PC is most uncommon (defying the logic), decision making in LC-BPPV etc.

OUR ENCOUNTERS WITH SPONTANEOUS MAL DE DEBARQUEMENT SYNDROME IN A NEUROTOLOGY CLINIC AT KOLKATA

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Spontaneous Mal de Debarquement Syndrome (Spont. MdDS) is a condition where patient complains of persistent sensation of swaying or rocking which is a subjective feeling without any objective signs. These patients feel as if they are standing on the deck of a ship and the sensation persists even when they are sitting or sometimes even when lying down. The sensation is much lesser or absent when they are actually in motion i.e., when walking or travelling in a train or bus. Though this is in many ways typical of Mal de Debarquement syndrome which is related to a disorder in the otolith system and which occurs only after a prolonged sea voyage, none of these patients have any history of prior exposure to any voyage in a ship which is always there in the classical Mal de Debarquement syndrome. This condition termed as **Spontaneous Mal de Debarquement Syndrome** is fairly commonly seen in routine neurotology practice but they cannot be labeled as Mal de Debarquement Syndrome as there is no history of sea voyage.

Some such cases are reported and are a not so uncommon experience of many clinicians. They fit into a condition described by Cohen [1] as Spontaneous Mal de Debarquement Syndrome (Spont MdDS). It is believed to be primarily a psychogenic condition as all vestibular function tests and clinical tests are always found to be normal. Treatment advocated by them in literature is PAROXYTINE and VENLAFLEXIN

In our clinic at Kolkata we have found 39 patients in last 6 months who had typical symptoms very similar to the symptoms described by Cohen. We treated them with a combination of Escitalopram & Etizolam as we found them to be more effective than the suggested paroxytine / venlaflaxin. Treatment was started after reassurance and adequate counseling. Non specific Vestibular Rehabilitation (the routine Cawthrone Cooksy Exercises and some yogic asanas) was advised to everyone along with Escitalopram (12 weeks) & Etizolam (4-6 weeks). Patients were followed up from 6 weeks to 3 months. 80% of the patients had significant relief in the symptoms and in the rest there was some improvement but not total .

The diagnosis of Spontaneous Mal de Debarquement Syndrome and management by escitalopram and etizolam has shown promising results in all suspected patients who present with this typical problem but psychological counseling before starting the treatment helps in a big way. Further multi centric trials are needed to formulate a standard management protocol for this fairly common condition.

References

1. *Mal de debarquement syndrome.* **Cohen, B, Dai, M and Cho, C.** 2015, Neurology: Clinical practice, pp. 369-370.

VESTIBULAR DYSFUNCTION IN TYPE-II DIABETES MELLITUS

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Aims & Objectives: To evaluate the patients of type-II DM for Sensorineural hearing loss and Vestibular dysfunction. To correlate Vestibular dysfunction with glycemic control

Materials & Methods: *Study design* : An observational cross sectional study .*Study population*: Patients of Type-II Diabetes diagnosed as per Diagnostic Criteria of American Diabetes Association (ADA) attending OPD of Rural Tertiary Care Teaching Hospital. *Sample size*: 100. *Inclusion criteria*:1. Patients diagnosed with Type-II Diabetes Mellitus coming to Medical College .2.Age :30 - 60 years *Exclusion criteria* :Patients with other systemic diseases and already diagnosed cases of Vertigo.

Institutional Ethics Committee approval was taken. Patients fulfilling the selection criteria underwent a detailed history and oto-neurological examination . Patients were evaluated with DHI (Dizziness Handicap Inventory) and underwent investigations viz ; Blood sugar levels, HbA1C,Urine tests, Audiometry, VNG with Caloric tests and OAE.

Observations & Results: Out of 100 patients ,62 were males and 38 were females between 30 to 60 years of age. The mean fasting blood glucose level was 140.5 ± 70 mg/dl, and the mean postprandial blood glucose (2 hours) was 231 ± 70 mg/dl. The patients were divided into three groups depending on HbA1c, to denote control, Good (≤7%), Moderate (>7, ≤12%), Poor (>12%).70 patients had evidence of Vestibular Dysfunction (VD). Out of these 70 patients, 36(51.4%) had Right Vestibulopathy, 29(41.4%) had Left Vestibulopathy and 5(7.2%) had a Bilateral Vestibulopathy. 22 patients had BPPV, and 6 patients had a Spontaneous Nystagmus. VD was present in 11(42.3%) in Good control group, 44(74.5%) in Moderate control group and 15(100%) in Poor control group. Chi square test was statistically significant (p-value = 0.0002598).

Conclusion: There is a significant association between Type II Diabetes Mellitus and Vestibular Dysfunction(VD). Also both SNHL & VD are more likely to occur, with worsening of glycemic control. It is important to recognize VD as a potential cause for imbalance and vertigo in DM.

SUBJECTIVE VISUAL VERTICAL: FINDINGS OF 500 VERTIGO PATIENTS

Dr Anita Bhandari
India

Introduction: Subjective visual vertical(SVV) is a test to determine the ability to perceive verticality. This may be affected in peripheral and central vestibular disorders.

Objective: To evaluate 500 patients of vertigo using Static and Dynamic SVV testing and comparing the results with normal subjects.

Method: 500 patients with a presenting symptom of vertigo were evaluated using Static and Dynamic SVV. 50 neurotologically normal subjects were taken as controls.

Results: Static SVV was seen to be abnormal in patients of labyrinthitis, vestibular neuritis,otolithic dysfunction and some central disorders.But Dynamic SVV was a more effective tool in assessing patients of recurrent vertigo and the effect of rehabilitation.Proposal for considering revision in SVV parameters are also described.

Key words: subjective visual vertical, static, dynamic, utricle

POSTER PRESENTATIONS

[PP 01]

DOES NOCTURNAL HYPOXIA CAUSE VESTIBULAR DYSFUNCTION IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA?

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Department of Otorhinolaryngology, Head and Neck Surgery, University Medical Center Mannheim, Mannheim, Germany

Introduction: It has already been shown that nocturnal hypoxia may lead to cochlear dysfunction in patients with obstructive sleep apnea (OSA). Less is known whether hypoxia during sleep also impacts vestibular function in those patients. Therefore, the aim of the presented study was to assess a potential vestibulotoxic effect of nightly desaturations with hypoxia in patients suffering from obstructive sleep apnea by investigating a possible correlation between sleep apnea parameters and vestibular function test results

Patients and Methods: Vestibular function was assessed using video head-impulse-test (vHIT) to evaluate horizontal semicircular canal function and cervical and ocular vestibular evoked myogenic potentials (oVEMPs, cVEMPs) to measure otolith function in 50 patients, who underwent a cardiorespiratory polysomnography (PSG) at our sleeping lab. Kendall's tau was performed to correlate vHIT and VEMPs results with polysomnographic parameters (e.g. apnea-hypopnea index (AHI), oxygen desaturation index (ODI))

Results: A correlation between horizontal semicircular function and polysomnographic parameters could not be demonstrated in this study ($p>0.05$). VEMP results showed a trend towards correlation with ODI and AHI.

Conclusion: Though a correlation between pathological vHIT results and pathologically elevated AHI and ODI could not be demonstrated in this study, VEMP results, however, showed a trend towards a correlation with AHI and ODI. Vestibulotoxicity due to nocturnal hypoxia in patients with obstructive sleep apnea should be taken into consideration whereby otolith organs seem to respond more sensitively to potential damage.

Keywords: vestibular function, vestibulotoxicity, obstructive sleep apnea, hypoxia

[PP 02]

UTILITY OF PSYCHOLOGICAL SCREENING FOR THE DIAGNOSIS OF PEDIATRIC EPISODIC VERTIGO

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Background/Objectives: Childhood episodic vertigo has been reported to be associated with migraine or childhood periodic syndromes such as benign paroxysmal vertigo of childhood. There is discrete evidence that unexpected recurrent vertigo is associated with a high level of depression and anxiety in adults. However, only a few studies describe the frequency and characteristics of psychiatric comorbidity in vertiginous children. The aim of this study is to evaluate the incidence and characteristics of emotional and behavioral problems using outpatient-based psychological screening tools in children with episodic vertigo attacks.

Methods: A total of 105 patients and 138 controls, aged 4 to 17 years, were enrolled. All were identified with a primary complaint of recurrent episodic vertigo. All patients received a complete battery of audiological and vestibular tests. Psychological assessment was performed using standardized questionnaires, including Strength and Difficulties Questionnaire (SDQ), Children's Depression Inventory (CDI), and Screen for Child Anxiety Related Emotional Disorders (SCARED).

Results: Compared with community controls, children presenting vertigo attacks had significantly higher mean scores on almost all scales of SDQ, CDI, and SCARED, except two parameters, namely, prosocial behavior and separation anxiety. About half of the patients, compared to 10 to 11% of the controls, had significant levels of distress that could adversely impact treatment outcomes and might need psychiatric consultation. Significant distress or impairment in social interactions was more prominent in older ages.

Conclusion: Our findings suggest that children/adolescents with recurrent episodic vertigo should be screened for possible associated psychological symptoms.

Keywords: Pediatric, Vertigo, Dizziness, Psychological, Anxiety, Depression

[PP 03]

ROLE OF GINKO BILOBA FOR CONTROLLING RESIDUAL DIZZINESS AFTER SUCCESSFUL TREATMENT OF BENIGN PAROXYSMAL POSITIONAL VERTIGO

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Objectives: Canalith repositioning therapy is usually effective treatment in BPPV. However, still some patients present residual dizziness after successful and effective repositioning maneuver. The objective of this study was to evaluate the role of Ginko biloba on residual dizziness after Canalith repositioning maneuver in patients of BPPV. Ginko biloba is an herbal medicine which enhances the blood supply to inner ear and brain.

Materials-Methods: Ninety two patients with BPPV were divided randomized into two treatment groups, Ginko biloba group and Non-Ginko biloba group. The Ginko biloba group received the similar canalith repositioning therapy as the

non-Ginko biloba group, with addition of Ginko biloba treatment. The duration of residual dizziness of Ginko biloba group and non-Ginko biloba group were compared. The scores of dizziness handicap inventory of these two groups were also compared.

Results: The duration of residual dizziness of Ginko biloba group was shorter than non-Ginko biloba group. There were no significant differences in the dizziness handicap inventory scores in the first weeks whereas much significant differences in second, third, fourth, fifth, sixth, seventh and eight weeks.

Conclusion: This study demonstrates that Ginko biloba can significantly minimizes the residual dizziness after successful therapy with repositioning maneuver in patients of BPPV.

Keywords: Benign paroxysmal positional vertigo, Ginko biloba, residual dizziness, Epley's maneuver

[PP 04]

MANAGEMENT OF MIGRAINE RELATED VERTIGO: A RETROSPECTIVE ANALYSIS OF 35 PATIENTS

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Introduction: Migraine related vertigo (MRV) or migraine associated vertigo or vestibular migraine is a common problem in modern society but is mostly underdiagnosed and mistreated.

Material-Method: This is a retrospective study of 35 patients with proper diagnosis of MRV, according to diagnostic criteria as stipulated in Consensus document of the Barany Society and the International Headache Society who had undergone a comprehensive management protocol comprising of lifestyle modification, pharmacotherapy and vestibular rehabilitation exercises. Pharmacotherapy consisted of propanolol sustained release 40 mg daily for 3 months in 32 patients. 3 patients who had history of bronchial asthma were given flunerazine 10 mg daily for 3 months. Acute dizziness was controlled by prochlorperazine mouth dissolving tablets when necessary, but prolong anti vertigo medications were not used. Patients were monitored at 0, 1 and 3 months for improvement using the dizziness handicap inventory.

Result and observation: It was found that substantial improvement was seen in the dizziness symptoms as well as co morbid conditions like headache, nausea etc over the 3 month period. Dizziness score improvement was seen in 33 (94%) of 35 patients. Headache improved in 26 (96%) of the 27 patients. Nausea and vomiting which was complained by 31 patients, improved in all over this period. Of the 35 patient, 23 had frank vertigo, of which all improved. Non vertiginous dizziness was present in 12 patients, of which 10 improved. No patient reported worsening of symptoms.

Conclusion: A combined therapy which includes both lifestyle modification and vestibular rehabilitation along with pharmacotherapy gives good result in MRV. However ours is a study limited by both number of patients and duration. Taking this as a pilot project, a more detail study for a longer duration will be helpful in a proper conclusion

Keywords: migraine related vertigo, pharmacotherapy, lifestyle change

[PP 05]

DEVELOPMENT OF THE PERSIAN VERSION OF THE VERTIGO SYMPTOM SCALE: VALIDITY AND RELIABILITY

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Objective: Vertigo Symptom Scales (VSS) is a proper instrument for assessing the patient status, clarifying the symptoms and examining the relative impact of the vertigo and anxiety on reported handicap. Our aim is the translation and cross cultural adaptation of the VSS into Persian language (VSS-P) and investigating its validity and reliability in patients with peripheral vestibular disorders.

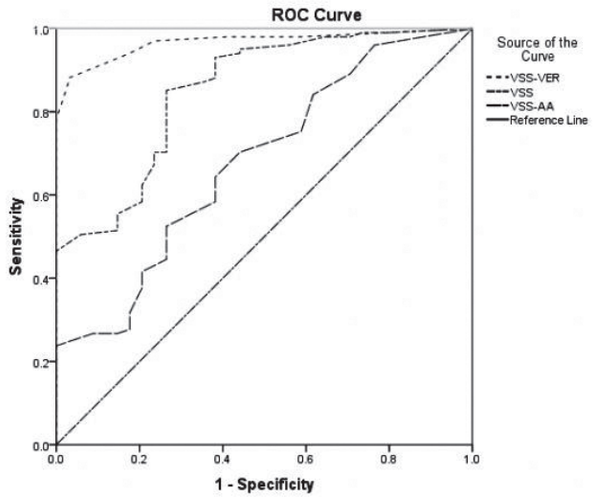
Method: VSS was translated into Persian. Cross-culturally adaptation test was carried out on 101 patients with peripheral vestibular disorders and 34 subjects with no history of vertigo. They completed the Persian versions of VSS, dizziness handicap inventory (DHI), and Beck anxiety inventory (BAI) in order to investigate psychometric parameters.

Result: The VSS-P showed good face validity. Internal validity confirmed the structure of the scale. Significant difference between the median scores for patient and healthy groups was reported in discriminate validity ($p<0.0001$).Convergent validity revealed high correlation between both BAI and DHI with VSS-P. The internal consistency was good with Cronbach's alpha 0.90 for VER subscale, 0.86 for AA subscale, and 0.92 for the overall VSS-P. There was a high test-retest reliability; with intraclass correlation coefficient of 0.89, 0.86 and 0.91 for AA, VER and VSS-P, respectively.

Conclusion: The Persian version of the VSS could be used clinically as a valid and reliable tool. Thus, it is a key instrument in order to focus on the symptoms associated with dizziness

Keywords: vertigo symptom scale (VSS), Vertigo, Anxiety, Persian, Validity, Reliability

ROC-Curve for discrimination between dizzy patients and healthy subjects.VSS: vertigo symptom scale, VSS-VER; vertigo subscale, VSS-AA; autonomic-anxiety subscale



Intercorrelations between VSS-P, anxiety and disability in dizzy patients (n: 101)

	VSS	VER	AA
VER	0/76		
AA	0/90	0/46	
DHI	0/53	0/32	0/51
BAI	0/60	0/40	0/58

[PP 06]

SUCCESS OF THE MODIFIED EPLEY MANEUVER IN BENINGN PAROXYSMAL POSITIONAL VERTIGO

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Benign paroxysmal (BPPV) positional vertigo is a common condition seen by otolaryngologists. The canalith repositioning maneuver as defined by Epley can be an effective treatment for BPPV.

A retrospective review of 87 patients with BPPV treated by CRM between June 2012 and June 2016 at Afyonkarahisar State Hospital Otolaryngology Clinic was done. Each patient was diagnosed as BPPV by history and Dix-hallpike maneuver. Patients received Modified Epley Maneuvers, were instructed to remain upright for 48 hours and avoid sudden head movements. Patients were followed up with repeat Dix-Hallpike maneuvers at 1 week. If symptoms persisted the maneuver was repeated for up to a maximum of four times, at which point patients were considered to have failed treatment.

The average age of patients in this study is 46.9 years. 35 % of the patients were male. In 40 (46%) patients the left ear, in 47 (54%) the right ear were effected. Symptoms resolved after the first session in 29 (33.3%) patients after the 2nd in 27 (31%) patients, after the 3rd in 13 (15%)patients and after the 4th in 15 (17.2%) patients. Three (3.5%) patient did not benefit from the maneuver. The average follow up period is 3.1 months and no recurrence was seen in the follow-up period of the patients.

The Modified Epley Maneuver is a safe and cost effective treatment modality for BPPV and it can be easily performed as an office based procedure.

Keywords: Vertigo, BPPV, Epley, Maneuver, Treatment

Number of patients treated with Modified Eplay Maneuver

	After 1.maneuver	After 2.maneuver	After 3.maneuver	After 4.maneuver	No benefit	Total
Number of patients treated	29 (%33.3)	27 (%31)	13 (%15)	15 (%17.2)	3 (%3.5)	87

[PP 07]

APPLICATIONS OF VIDEO HEAD IMPULSE TEST IN CHILDHOOD

Mario Milkov
Medical Univerwsity "Prof. P. Stoyanov" Varna

Vestibular disorders occur relatively common in children worldwide. The comprehensive review of new publications in pediatric otology reveals a variety of conventional diagnostic tests. The recently introduced video head impulse test (vHIT) evaluates all six semicircular canals and occupies a rising relative share in the diagnostic armamentarium in childhood vestibular diseases. vHIT is more sensitive than clinical head impulse test (cHIT), especially in patients with isolated covert saccades. vHIT test identifies the vestibular weakness by gain reduction and the appearance of overt and covert saccades.

In 28 typically developing children and adolescents at a mean age of 10±3.5 years, mean angular vestibular ocular reflex gain estimates by means of vHIT are between 1.00 and 1.04 for lateral and between 1.03 and 1.08 for vertical canals. The percentage range of trials with peak head velocities greater than 100 degrees/s is between 32% and 49% for right lateral, between 31% and 49% for left lateral, between 0% and 11% for right anterior, between 3% and 4% for left anterior, between 1% and 7% for right posterior, and between 2% and 8% for left posterior canal findings in 41

ones. Single canal affection is diagnosed in 29 patients but combined one in 12 patients. In single canal affection, four patients present with isolated horizontal canal, five - with anterior and 20 with posterior canal damage while in combined canal affection, there is damage in the same ear. Both left anterior and left posterior canals are most commonly affected.

The results from a retrospective, observational, descriptive, and cross-sectional study show that the most common balance disorders among 206 children aged between one and 18 years (at a mean age of ten years) are the following: vestibular migraine in 21.8%; ataxia in 9.22%, childhood benign paroxysmal vertigo in 7.77%, and post-traumatic vertigo in 6.31% of the cases. A total of 46 out of 61 videonystagmographies and 45 out of 55 vHITs are normal.

There is a family history of migraine in most children. The vHIT provides important information to confirm the diagnosis of balance disorders in childhood. Taking into consideration that rotatory chair testing and caloric test are usually not tolerated well by children, vHIT evaluation has been carried out in 42 children aged between 3 and 16 years with or without balance problems within a prospective monocentric study. Horizontal vestibulo-ocular reflex is assessed by using a video-oculography system device (EyeSeeCam©).

The children without balance problems in history show a median gain of 1.02±0.28 and a significant gain reduction between 40 and 80 ms ($p<0.05$) while those with balance disorders have a significantly reduced gain Corrective saccades show sensitivity and specificity of 100% for detecting this abnormal function. vHIT offers major potential advantages over rotary chair and caloric testing in children with benign paroxysmal positioning vertigo, vestibular neuritis and other inner ear diseases.

Keywords: Vestibular disorders, video head impulse test

[PP 08]

CHALLENGING TERMS OF NYSTAGMUS: CLOCKWISE OR COUNTER-CLOCKWISE

Deniz Tuna Edizer
Izmir Bozyaka Training and Research Hospital, Otorhinolaryngology Department

Nystagmus, which can be defined as rhythmical movements of the eyeballs, is a common finding in vestibular pathology. Once it is present concomitant with vestibular dysfunction, it should be investigated in detail to clarify the underlying pathology. Nystagmus due to peripheral vestibular diseases appears secondary to vestibuloocular reflex dysfunction. Vestibuloocular reflex aids in stabilization of vision during head movements. Each semicircular canal has unique effects on the direction of eye movements. To correctly define the directional vectors of nystagmus helps to identify which part of the peripheral vestibular system is affected and hence aids in the differential diagnosis of vestibular dysfunction. One of the main concerns in reporting the direction of nystagmus is about its torsional component. 'Clockwise' and 'counter-clockwise' are the terms used frequently in reporting the direction of the torsional component. Pubmed database was searched for articles in which the terms 'clockwise' and 'counter-clockwise' were used in defining the direction of the torsional component of the nystagmus. Some authors report the direction from the perspective of the patient, whereas others from the perspective of the examiner. This may lead to confusion in understanding the true direction of the nystagmus and hence the underlying vestibular dysfunction, especially for the readers. On the other hand, some other authors preferred to use the term 'geotropic' or 'apogeotropic' to define the torsional component of the positional nystagmus. In fact, spontaneous nystagmus may also have a torsional component as in the case of vestibular neuritis, where the direction of torsional component aid in correct diagnosis. It seems necessary to give a reference in defining the direction of the torsional component, rather than using the terms clockwise or counter-clockwise alone.

Keywords: nystagmus, clockwise, counter-clockwise

[PP 09]

CORRELATION BETWEEN AGE AND GENDER, AND PARAMETERS OF AUDITORY BRAINSTEM EVOKED RESPONSE

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Objective To analyze the correlation between age and gender, and the auditory brainstem response (ABR).

Materials and methods Adult volunteers with no history of ear disease were tested. ABR parameters; stimulated by click stimuli at 90 and 80 dBnHL, were analyzed. They included 1) absolute latencies of waves I, III and V, 2) interpeak latency of I-III, III-V and I-V, and 3) interaural latency difference of waves V between the ears.

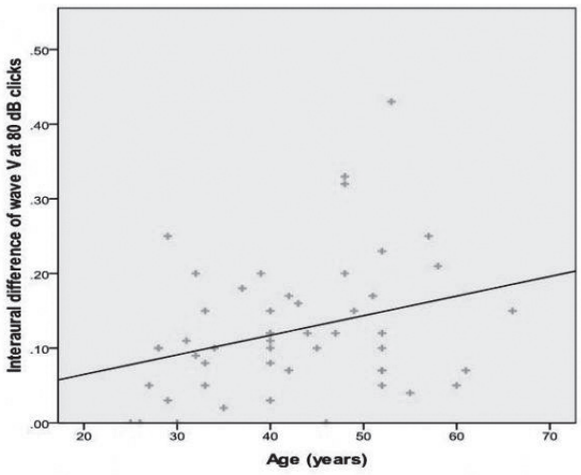
Results Sixteen males and 34 females, aged 25-66 years (mean 42.3±10.4 years) were include in the analysis. ILD-V at 80 dBnHL clicks showed significant correlation with increased age, and the equation predicted its value at 0.012 + [0.003 * age (years)]. The absolute latency of waves III, V in the male at 90 dBnHL clicks (p-value = 0.010, 0.024) and 80 dBnHL clicks (p-value = 0.014, 0.017) are significantly higher than the absolute latency of waves III, V in the female. The absolute latency of waves III, V re was no significant correlation between 1) age and absolute latency at 80 or 90 dBnHL clicks; 2) age and interwave latency at 80 or 90 dBnHL clicks; and 3) age and ILD-V at 90 dBnHL clicks.

Conclusion ILD-V at 80 dBnHL clicks correlated with increased age. The absolute latency of waves III and V in the males was signifi cantly higher than in the females at both 80 and 90 dBnHL clicks. Clinicians need to be cautious when interpreting

ABR results in the elderly with increased ILD-V value at 80 dBnHL clicks, or in males with delayed absolute latency of waves III and V at 80 and 90 dBnHL clicks.

Keywords: auditory brainstem response, absolute latency, interpeak latency, interaural latency difference

1 Scatter plots showing ILD-V at 80 dBnHL clicks and slope estimates the response changes by age



Note: #Simple linear regression

1 The r and p-value of correlation between the ABR responses and age at 90 and 80 dBnHL clicks

Pearson's correlation between		r (p-value#)	
		80 dBnHL clicks	90 dBnHL clicks
Age and absolute latency of	I	-0.022 (0.83)	0.024 (0.81)
	III	0.044 (0.67)	0.084 (0.41)
	V	0.051 (0.61)	0.037 (0.72)
Age and interwave latency of	I-III	0.059 (0.56)	0.064 (0.53)
	III-V	0.029 (0.77)	-0.19 (0.85)
	I-V	0.064 (0.53)	0.022 (0.83)
Age and ILD-V		0.305 (0.03*)	0.208 (0.15)

*Note: #Pearson's correlation, * statistical significant*

2 Differences of mean (SD) and p-value of ABR response parameter at 90 and 80 dBnHL clicks in male and female

	I_90	III_90	V_90	I-III_90	III-V_90	I-V_90	IAD-V_90	I_80	III_80	V_80	I-III_80	III-V_80	I-V_80	IAD-V_80
Male	1.63 (0.18)	3.83 (0.14)	5.76 (0.23)	2.20 (0.14)	1.95 (0.14)	4.13 (0.25)	0.11 (0.10)	1.71 (0.13)	3.88 (0.13)	5.83 (0.21)	2.17 (0.12)	1.95 (0.14)	4.12 (0.21)	0.11 (0.07)
Female	1.56 (0.09)	3.70 (0.16)	5.60 (0.22)	2.14 (0.16)	1.89 (0.17)	4.03 (0.22)	0.13 (0.09)	1.65 (0.10)	3.76 (0.18)	5.66 (0.24)	2.10 (0.18)	1.89 (0.17)	4.00 (0.22)	0.10 (0.07)
p-value#	0.010*	0.010*	0.024*	0.201	0.270	0.156	0.437	0.076	0.014*	0.017*	0.171	0.270	0.073	0.437

*Note: #t-test, *statistical significant*

3 Mean and standard deviation of ABR responses in normal hearing adults

Author	Subject	Click intensity	I	III	V	I-III	III-V	I-V	IAD-V
This study	50 adults	80 dBnHL	1.67 (0.12)	3.81 (0.17)	5.72 (0.24)	2.14 (2.14)	1.91 (0.17)	4.05 (0.23)	0.13 (0.09)
		90 dBnHL	1.58 (0.13)	3.75 (0.16)	5.65 (0.22)	2.17 (0.16)	1.9 (0.15)	4.07 (0.23)	0.10 (0.07)
Konrad-Martin 2012	81-95 adults (40-49 years)	75 dBnHL	1.67 (0.2)	3.83 (0.2)	5.72 (0.3)	2.16 (0.2)	1.90 (0.3)	4.04 (0.3)	NA
Petrova 2009	NA	60-70 dB above nHL or SL	1.59 (0.12)	3.76 (0.12)	5.69 (0.20)	2.17 (0.15)	1.93 (0.12)	4.10 (0.21)	0.09 (0.08)
Musiek 1986 (2SD)	46 ears	80 dB nHL	NA	NA	NA	2.05 (0.25)	1.85 (0.45)	3.88 (0.52)	NA
Schwartz 1989	20 ears	80 dB nHL	2.44 (0.098)	4.60 (0.15)	6.50 (0.19)	2.20 (0.16)	1.84 (0.17)	4.04 (0.18)	NA
Antonelli 1987	NA	100 dBpeSPL	1.54 (0.20)	3.73 (0.25)	5.52 (0.96)	2.19 (0.45)	1.79 (0.63)	3.98 (0.58)	NA
Ness DA 2009	20 adults	80 dBnHL	1.59 (0.11)	3.77 (0.11)	5.46 (0.20)	2.18 (0.11)	1.70 (0.16)	3.87 (0.20)	NA
Joseph,West,Thorton, Herman 198712	786 adults	NA	1.65 (0.14)	3.80 (0.18)	5.64 (0.23)	2.15 (0.14)	1.84 (0.14)	3.99 (0.20)	0.00 (0.11)
Mohammad FT 2007	19 adult 40-50 years	90 dBHL	1.67 (0.015)	3.82 (0.122)	5.75 (0.032)	2.15 (0.003)	1.93 (0.090)	4.08 (0.017)	NA
Solanki JD (2010)	23 male teenagers	60 dB	1.76 (0.18)	3.73 (0.14)	5.75 (0.79)	2.29 (0.26)	1.77 (0.20)	4.03 (0.20)	NA
	23 female teenager		1.70 (0.19)	3.71 (0.17)	5.72 (0.08)	1.95 (0.22)	2.05 (0.18)	4.00 (0.18)	NA

[PP 10]

VERTIGO AND VITAMINE D LEVELS

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Introduction: Benign paroxysmal positional vertigo (BPPV) is the most frequent cause of vertigo. While otoconia degeneration due to several reasons can mechanically cause BPPV, other vestibular symptoms can also appear because of the disturbances in otoconial functions with the destruction of inner structure of otoconia. Epithelial calcium channel transport systems, which have been showed in semicircular channels and cochlea maintain the calcium and carbonate levels of vestibular endolymph at a level that is required for normal otoconial function and up-regulate vitamin D calcium binding proteins through vitamin D receptors. The aim of this study was to determine vitamin D levels at the start of complaints in patients with BPPV and patients with non-specific vertigo and dizziness disorder other than BPPV, and to investigate the relationship between vitamin D levels and BPPV recurrence.

Method: Among the patients who presented to the Departments of ENT and Neurology for vertigo and dizziness between October 2015-September 2016 and diagnosed with BPPV (n=77) and non-BPPV vertigo and dizziness (n=84), patients with a vitamin D measurement within the same period were included to the study retrospectively. Fifty-six patients, who had BPPV diagnosis and vitamin D measurement and answered the phone call, were inquired for whether they received vitamin D treatment, whether they had new BPPV attacks, and the specifications of the attacks if they did. The correlation between initial vitamin D level and recurrence and characteristics of BPPV were analyzed.

Findings: BPPV group consisted of 65 females and 12 males with a mean age of 52.2±17.2 years. Non-BPPV group included 69 females and 15 males with a mean age of 48.7±16.1 years. Vitamin D levels were 12.8±5.8 ng/ml in BPPV group and 15.3±6.9 ng/ml in non-BPPV groups. Vitamin D levels were significantly higher in non-BPPV group compared to BPPV group (p=0,028). Among BPPV patients that received vitamin D treatment, 24 patients (61,5%) did not experience a new attack, 13 patients (33,3%) experienced 1 attack, and 2 patients (5,1%) experienced 2 attacks. Among BPPV patients that did not receive vitamin D treatment, 10 patients (58,8%) did not experience a new attack and 7 patients (41,2%) experienced 1 attack. The difference between the patients that received or did not receive vitamin D treatment in terms of BPPV recurrence was not statistically significant (p=0.887). There was not a statistically significant difference in vitamin D levels between patients who had attack and who did not have attack (p=0.264). There was not a statistically significant difference between the patients who had attack and who did not have attack in terms of age and gender.

Conclusion: Although a serum level of 25(OH)D below 20 ng/ mL is considered as serious deficiency, 21-29 ng/mL as deficient, and >=30 ng/mL as normal. It was seen that Vitamin D levels were lower in both patient groups and neither initial vitamin D levels nor vitamin D supplementation affected BPPV recurrence. When the role of vitamin D in vestibular functions and otoconia are considered, it is also possible that vitamin D deficiency might be related to other vestibular disorders.

Keywords: vitamin D, BPPV, dizziness, vertigo

[PP 11]

MEDIAL DISPLACEMENT OF GROMMET PRESENTED WITH VERTIGO

Fatih Mehmet Hanege, Mustafa Karabıçak
Ozel Giresun Ada Hastanesi

Otitis media with effusion (OME) is characterized by effusion of the middle ear without any infectious agents. It is commonly seen in otorhinolaryngology practice, especially in childhood age. Effusion in the middle ear is related with a conductive hearing loss and recurrent acute suppurative otitis media. After Armstrong reported the ventilation tube treatment for EOM in 1954, tympanostomy tube insertion has been one of the most common otological procedures worldwide. OME, chronic hypoventilation of the middle ear and recurrent acute suppurative otitis media are most frequent indications for tympanostomy tube insertion.

Some of the complications can occur after tympanostomy tube insertion. These complications include recurrent or persistent otorrhea, granulation tissue, tympanosclerosis, tympanic membrane perforation after extrusion, premature extrusion, atelectasis, blockage of the tube lumen, retraction pockets, cholesteatoma, hearing loss and rarely medial displacement of tympanostomy tube. Medial displacement of a tympanostomy tube is a rare complication that needs to be removed after making a myringotomy even in asymptomatic patients.

In this report we present our approach to a case of a 52 year old male patient presented to our clinic with vertigo and otalgia symptoms who had a tympanostomy tube insertion operation about 1 year ago. During our physical examination we saw that the tympanostomy tube was totally drawn into the middle ear by the tympanic membrane except the wire of the tube which was spotted outside the membrane. After trough investigation, miringotomy operation was performed on the tympanic membrane to release the tube from the middle ear. The perforation site was repaired by the paper-patch method. Postoperative 2 weeks follow up revealed that the symptoms totally recovered. Medial displacement of grommet tube is a rare situation which needs special attention. The tube should be removed and any damage should be repaired to avoid any long term complications.

Keywords: medial displacement of grommet, tympanostomy tube, vertigo

[PP 12]

INNOVATIVE USE OF GOGGLE CARDBOARD AND VIRTUAL REALITY (VR) IN VERTIGO

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Dept of ENT, Smt. Kashibai Navale Medical College & General Hospital, Pune- India

Vertigo is one of the most prominent and frequent neurological symptoms. It is estimated that about 30% of all people need medical care once in their life due to this index symptom. The neurological expertise required could be scarce in less accessible, remote areas. A quick examination includes history, patient's mental status, the cranial nerves, the motor system, reflexes, sensation and gait. One has to look for spontaneous nystagmus, Dix-Hallpike and head impulse test specifically.

The nystagmus can be better elicited by suppressing visual fixation and magnification by Frenzel glasses (fig.1), Munich glasses which consist of the combination of magnifying glasses (+20 lenses placed in front of the patient), and a lighting system, but are expensive (optical and video).

Goggle cardboard and VR devices (fig 2) that are developed for virtual reality could be used as a substitute in poor resource setting. The lens is about +24 diopters (similar to Frenzel). This helps in inhibition of gaze fixation and aids magnification. (fig. 3) The cardboard can be cut, and with its feather weight, headband is very handy and comfortable. On using it in 20 consecutive cases of vertigo, its usefulness was observed for identifying spontaneous nystagmus,

Dix Hallpike maneuvers for direction and torsional component of nystagmus and head impulse test as compared to the naked eye. Being a cheaper alternative it could be carried by every doctor in any setting. Similarly a smartphone can be fixed to a standard VR box. Its function of video camera recording with flash on can be used to record eye movements as in video Frenzels for documentation and prognosis. (fig.4) This further can be improvised by connecting the smartphone to any laptop or desktop computer for simultaneous viewing via the internet as in webcam applications thus creating a mobile lab without necessarily requiring heavy and immovable equipment.

Recently VR has been innovatively used for the following:1) Nystagmus oscillopsia simulator (fig 5), 2) Portable virtual vestibular stimulation,3) Eye tracking, 4) Head tilt response, 5) Newer research- tobiipro, 6) Vestibular rehabilitation in spino-cerebellar ataxia, 7) To assess traumatic brain injury in emergency setting, 8) image stabilization for oscillopsia.

The future of use of VR headset in diagnosis and rehabilitation of a patient of vertigo is infinite. A comprehensive software on android device played on VR could give information as good as a ENG/VNG, possibly posturography too. This could lead to a better bedside diagnosis. Also the rehabilitation of different type of vertigo: BPPV, vestibular neuritis or vestibulopathy could be VR app based.

Keywords: Goggle cardbox, VR, Vertigo, Frenzel Glasses

fig2- google cardbox and vr goggles

standard commercialy available google cardbox and VR goggles

fig3- use of modified google cardbox for examination of nystagmus

modified google cardboard with power of +24 dioptres (similar to frenzels) inhibits visual fixation and aids in magnification

fig4- innovative use of VR box for recording eye movements

smartphone video recording with flash on mounted on a VR box can be used to record eye movements of a patient of vertigo

fig5- VR app for oscillopsia simulaion

recent advances

frenzels glasses

standard optical frenzel glasses

Main Sponsor

Abbott

Exhibitors

Neuroequilibrium
Diagnostic Systems Pvt Ltd.

General Information

Venue

The Grand Hyatt Mumbai

Off Western Express Highway,
Santacruz (East)
Mumbai, India 400 055
Phone : +91 22 6676 1234
Fax : +91 22 6676 1235
Web : www.mumbai.grand.hyatt.com

The Grand Hyatt Mumbai is conveniently located 15 minutes from the Chhatrapati Shivaji International Airport via taxi. It is also centrally located within the city of Mumbai, with easy access to North, Central, South Mumbai and the Western Suburbs. This city landmark is also minutes away from popular shopping districts such as Bandra, Lower Parel and Colaba in Mumbai and a bevy of local attractions such as Gateway of India, Prince of Wales museum, Chhatrapati Shivaji Terminus and Dhobhi Ghat amongst others.

Room Amenities

Guest room amenities include:

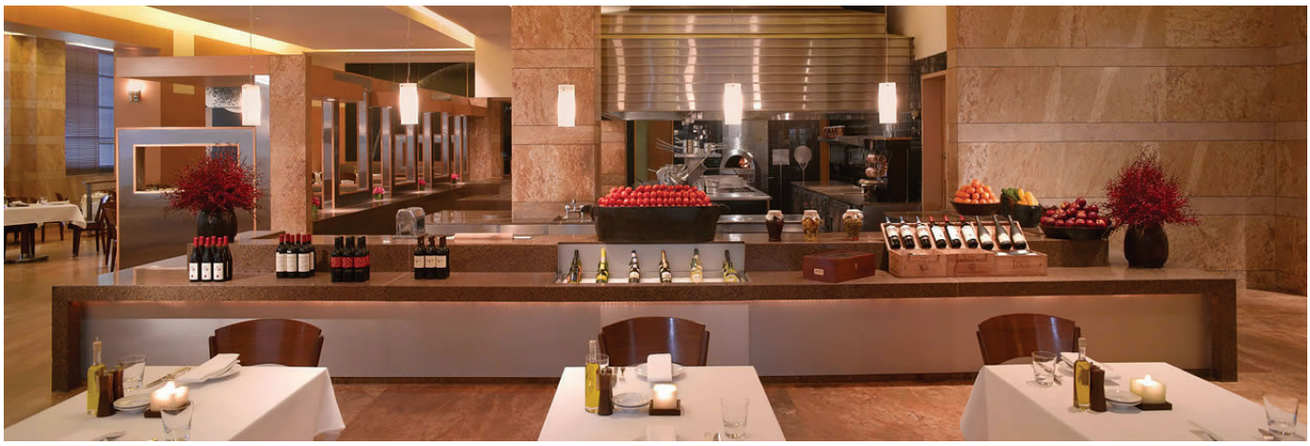
- 40 –inch LCD TV with Cable channels
- A functional workstation with high-speed broadband Internet connectivity and wireless access
- Dual-line telephones with IDD, conference call, and voice messaging system
- Complimentary mineral water and fruit platter
- Tea/coffee-making facilities and mini bar
- Personal safe, large enough to accommodate a laptop
- Spacious bathrooms with separate bath and shower

Dining Options

The Grand Hyatt Mumbai offers an array of dining and beverage options, with four restaurants and three bars on the premises:

- China House is designed to exude the warmth of a typical Chinese home, featuring home-style Sichuan cuisine, a fine selection of Chinese teas, as well as other signature Chinese delicacies.
- Fifty Five East is open for three meals a day and features dramatic show kitchens. It offers myriad choices that include the true taste of Thai, sushi, Lebanese mezze, Indian and Western dishes.
- Celini is a contemporary restaurant offering truly Italian home-style cooking inspired by its Molteni show kitchen, which includes a wood-fired pizza oven, rotisserie, and charcoal grill.
- Soma offers tandoor and grilled specialties from authentic North Indian & North-West frontier cuisine. The tandoor show-kitchen is the restaurant's central feature where you can see our skilled chefs preparing your meal right before your eyes.
- Lobby Lounge is a contemporary, stylish, informal lounge with a warm ambience. It offers an a la carte menu and features a selection of premium Eau de Vie and Indian single estate teas.
- The Bar is known for its fine selection of wines and whiskies, and offers an ideal place to sit back and unwind with pre- and post-dinner drinks.
- China House Lounge is the ideal place to linger after dinner to enjoy a drink or to party to the high energy music spun by the in-house DJ.

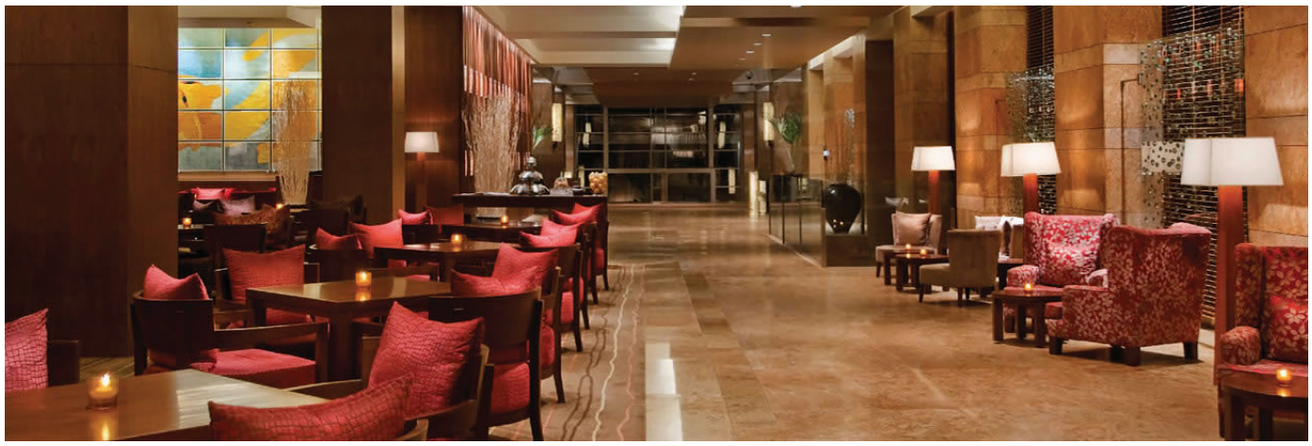
China House



Celini Restaurant

Soma Restaurant

Fifty Five East Restaurant



Lobby Lounge

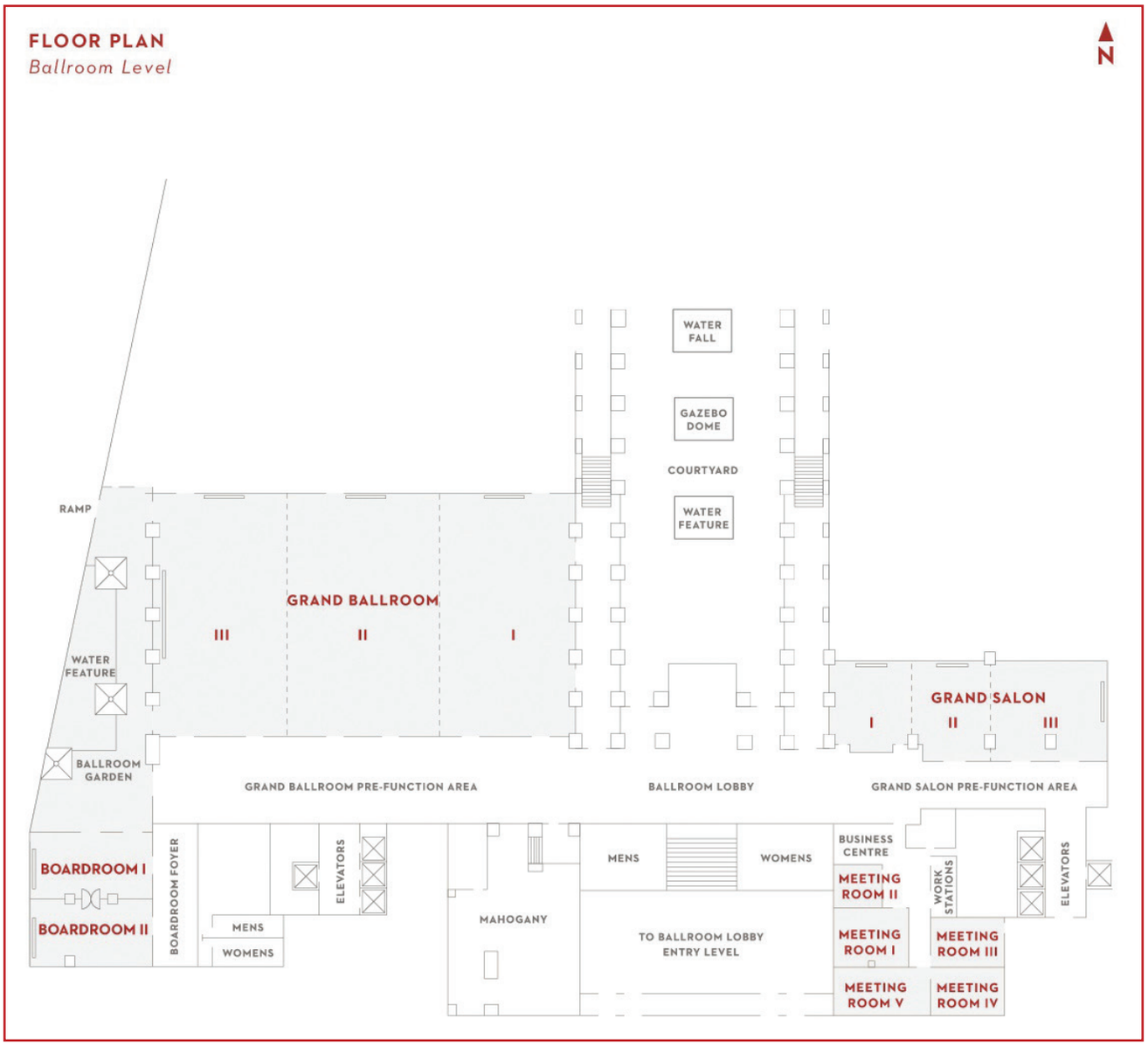
Gourmet Store

China House Lounge

The Bar

Location of Activities

Ballroom Level



Registration Desk	: Ballroom Lobby
Accommodation Desk	: Ballroom Entry Level
Exhibition and Poster Area	: Grand Ballroom Pre-Function Area
Coffee Break and Buffet Lunch Area	: Grand Ballroom Pre-Function Area
Opening Ceremony Dinner	: Grand Ballroom II + III
Speaker Ready Room	: Back of the Grand Ballroom II + III

Useful Travel Information

Public transport

Rail: In Mumbai, there are two rail lines (Western Line and Central Line) that run North-South through the city. The Grand Hyatt Mumbai is 1.5 km from the Santacruz stop on the Western Line. Although the trains run frequently from 4:30 AM – midnight, they are often quite crowded. Trains have separate compartments for women, senior citizens, and people with disabilities. There are also Mumbai Metro and Monorail lines, although these are not convenient to the hotel. The rail networks are also not conveniently located near many of the tourist sights, and are not recommended for visitors. For more information, visit the Indian Railways website.

Taxi: The most convenient option for travel in Mumbai is the taxi, although trips can often be slow due to the volume of traffic on the roads. Blue and silver taxis offer air conditioning, and are about 25% more expensive than the black and yellow taxis without air conditioning. All taxis have meters that will display the exact fare that you have to pay. Night fares are 25% extra. Popular cab companies include:

Mega Cabs (Tel: 022-42424242)

Meru Cabs (Tel: 022-44224422)

Easy Cabs (Tel: 022-43434343)

Auto-Rickshaw: Three-wheeled auto-rickshaws are not allowed in the city center. They have three passenger seats, with no extra room for luggage. All rickshaws are equipped with a fare meter.

Time Difference

Mumbai is 5 hours and 30 minutes ahead of Greenwich Mean Time.

Climate

Mumbai has a tropical climate that is moderately hot and quite humid. Because it is a coastal city, temperatures do not fluctuate much throughout the year. In February, the average high is 31 C (88 F), while the average low is 18 C (64 F).

Customs and Medicines

Travelers may bring medicines in reasonable quantities. Travelers are allowed to bring unlimited quantities of foreign currencies; however, amounts exceeding 5,000 USD cash or 10,000 USD in traveler's cheques must be declared. For information regarding customs regulations upon entering India, please visit: http://www.iatatravelcentre.com/IN-India-customs-currency-airport-tax-regulations-details.htm

Currency and Foreign Exchange

The currency of India is the rupee. Currency can be exchanged at the airport, at major banks, authorized money changers, as well as at the Grand Hyatt Mumbai. The easiest currencies to exchange are U.S. Dollars and British Pounds Sterling.

Credit cards

In major cities, a wide array of credit and debit cards are often accepted (American Express, Diners Club, Visa, and Mastercard) at larger shops. Smaller shops might only accept cash. If you will be traveling outside of Mumbai, your options will likely be limited to cash, Visa, and Mastercard.

ATMs

24 hour ATMS can be found in major cities and most large towns. The most commonly accepted cards are Visa, Mastercard, Maestro, Cirrus, and Plus.

Shops, banks, museums opening hours

Shopping malls are generally open 10:30 AM – 10:30 PM, 7 days a week. Other shopping areas, such as bazaars, are generally open from morning to night, although may not be open daily. You should inquire about the hours before visiting these shopping areas.

Electricity

Sockets are supply 220/240 V, and use a "Type D" Indian socket.

Internet

There are many cyber cafes in Mumbai, and some are open 24 hours. Many restaurants and cafes also offer WiFi access. Additionally, the congress venue (Grand Hyatt Mumbai) offers WiFi.

Emergency phone numbers

Fire department: 101

Police: 100

Ambulance: 1298

Useful phone numbers

Women's helplines 22828862, 26140403

Children's helpline 1098

Senior citizens' helpline 613811111

Railway Emergency 23004000

Airport Police Helpline 28225709

Missing Persons Bureau 22621547

BMC Disaster Management Cell 22694725

About Mumbai

The city of Mumbai has grown from a group of small fishing villages scattered across seven islands into the financial, commercial, and entertainment of capital of India. Today, Mumbai is the home of many of India's financial institutions, the globally-influential Bollywood film industry, and over 18 million residents, making it the ninth most populated urban area in the world and a top-ten center of commerce based on global financial flow.

The city's history is evident in its architecture. For centuries, the area was under the control of successive indigenous empires before being ceded to the Portuguese and subsequently to the British East India Company. During the mid-18th century, the city (then known as Bombay) was reshaped by the Hornby Vellard project, which reclaimed land from the sea, constructed major roads and railways, and transformed Bombay into a major seaport on the Arabian Sea. Today, the architecture of the city is a blend of Gothic Revival from the British colonial period, Indo-Saracenic buildings such as the Gateway of India, Art Deco, and other contemporary styles.

Mumbai's culture is also a blend featuring traditional festivals, food, music, and theatres. The city offers a cosmopolitan and diverse lifestyle with a variety of food, entertainment, and night life, available in a form and abundance comparable to that in other world capitals. This diversity of cultures, religions, and cuisines coexisting in the city can be traced through the city's history as a trading center and the migration of people from all over India to Mumbai since the British period.

Notable Sights

Gateway of India – The city's most visited tourist attraction was constructed to commemorate the visit of King George V and Queen Mary to India in 1911. Situated on the harbor of the Arabian Sea, the Gateway served as the ceremonial point of entry for Viceroys of India and Governors of Bombay, as was often the first sight one would see when approaching the city by sea.

Colaba Neighborhood – While you are visiting the Gateway to India, take some time to

wander around the neighborhood of Colaba. The area is filled with galleries, shops, and old-time restaurants that give you the feel of the pulse of this city.

Global Vipassana Pagoda – This meditation temple was inaugurated in 2009. It was constructed in a Burmese style in appreciation of Burmese monks' efforts to preserve the Vipassana Buddhist tradition. This architectural marvel can accommodate 8,000 people meditating, and also offers 10-day meditation courses, as well as 1-day courses offered on Sundays.

Chhatrapati Shivaji Terminus – This architectural gem is both a UNESCO World Heritage Site and a functioning rail station serving three million passengers per day. This property is an outstanding example of Victorian Gothic Architectural Revival in India, blended with the themes derived from Indian Traditional Architecture. Its remarkable stone dome, turrets, pointed arches and eccentric ground plan are close to traditional Indian palace architecture. It is an outstanding example of the fusion of two cultures, as British architects worked with Indian craftsmen to include Indian architectural tradition and idioms thus forging a new style unique to Mumbai.

Chhatrapati Shivaji Maharaj Vastu Sangrahalaya Museum – A renowned museum in South Mumbai which houses rare archeological artifacts from the Indian subcontinent, as well as Japan, China, and Europe. The museum is best known for its collection of Indian miniatures, Maratha textiles, and armour. Additionally, the museum features natural history specimens in interactive exhibits that are great for families with children.

AUTHORS INDEX

Vertin* OD

(Betahistine Sustained Release Tablets 24mg, 32mg & 48mg)

Simply **ONE** *for* **all day Vertigo Relief**

Restoring Balance with Once a Day therapy

Unique Hydrophilic matrix extended release formulation[1,2,3]

Dose and time dependent effect[4,5]

- Higher the dose greater the efficacy[5]
- Long term treatment even at 48mg TID was well tolerated[5]

1. www.pharmatech.com, Modulation of drug release from hydrophilic matrices as accessed on April 2012 2. Maderuelo et al.Critical factors in the release of drugs from sustained release hydrophilic matrices.J Control Release 2011;154: 2-19; 3. Levina et al. The Influence of Excipients on Drug Release from Hydroxypropyl Methylcellulose Matrices. J Pharm Sci 2004;93: 2746-54; 4. RR Alcocer et al. Use of betahistine in the treatment of peripheral vertigo. Acta Otolaryngol. 2015 Aug 6:1-7.; 5. Strupp M et.al., Long-term prophylactic treatment of attacks of vertigo in Menière's disease--comparison of a high with a low dosage of betahistine in an open trial. Acta Otolaryngol 2008; 128(5): 520-4

Abbreviated Prescribing Information (Refer to full prescribing information for complete details) Vertin* Betahistine Tablets IP 8 mg / 16 mg / 24 mg Indications: Meniere's Syndrome as defined by the following triad of core symptoms such as vertigo (with nausea/vomiting), hearing loss (hardness of hearing), tinnitus. Symptomatic treatment of vestibular vertigo. Dosage and administration: The dosage for adults is 24-48 mg divided over the day. Contraindications: Hypersensitivity to the active substance or to any of the excipients. Phaeochromocytoma. Adverse reactions: Undesirable effects reported during clinical trials (common >1/100, <1/10) include nausea and dyspepsia and headache. Hypersensitivity reactions, e.g. anaphylaxis. Mild gastric complaints (e.g. vomiting, gastrointestinal pain, abdominal distension and bloating), these can normally be dealt with by taking the dose during meals or by lowering the dose. Cutaneous and subcutaneous hypersensitivity reactions, in particular angioneurotic oedema, urticaria, rash, and pruritus. Precautions: Patients with bronchial asthma and history of peptic ulcer need to be carefully monitored during therapy. May cause allergic reactions (possibly delayed). Storage: Store in a cool & dry place. Shelf-life: Vertin tablets are stable for 3 years from the date of manufacture when stored at recommended storage conditions. Manufactured by: Abbott India Limited, 26A, Narayan Plaza, Chandivali Road, Andheri (E), Mumbai 400 072 At: Plot No. D-5, MIDC, Paithan- 431 148, Aurangabad. Marketed by: Abbott India Ltd. 3-4, Corporate Park, Sion- Trombay Road, Mumbai-400071. Issued on: December 2012.

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Vertin*

(Betahistine hydrochloride tablets IP 8 mg, 16 mg & 24 mg)

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1. Lacour M. Betahistine treatment in managing vertigo and improving vestibular compensation: clarification. J Vestib Res. 2013;23(3):139-51; 2. Vranic J D et al, Betahistine or Cinnarizine for treatment of Meniere's disease. Med Arh. 2012 Dec 66(6): 396-98

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