





The 25<sup>th</sup> Annual Meeting of ADMA Valencia 2015

SCIENTIFIC PROGRAMME Wednesday 13 May 2015

VENUE: Aula Magna, Universitat de Valencia, Spain

# Welcome to the 25<sup>th</sup> Annual Meeting of the Anglo-Dutch Migraine Association

We would like to thank the following for their support of this years' event:

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### Hans Carpay and Emile Couturier Local Organisers

## Morning Session

(chairmen Russell Lane and Emile Couturier)

9:00-9:30	Registration-Aula Magna
9:30-9:35	<b>Opening by local organisers:</b> Hans Carpay and Emile Couturier
9:35-9:50	<b>Welcome to Valencia</b> Professor Miguel Láinez (IHS congress Co-Chair)
9:50-10:40	Anglo-Dutch Duo presentation "Do we know what we don't know?" Professor Michel Ferrari (NL) and professor Peter Goadsby (UK)
10:40-11:00	Coffee break
11:00-11:30	<b>History of 25 years ADMA</b> Peter Koehler
11:30-12.00	<b>Special presentation by ADMA</b> <b>founder</b> Professor Tim Steiner
12.00-12:45	<b>23rd Marcia Wilkinson Lecture</b> Professor Alan Rapoport, President of the IHS

12:45-14:00 Lunch in courtyard La Nau

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## Afternoon Session

(chairmen Paul Shanahan and Ton van Diepen)

14:00-17:00

# The Next Generation: Young Investigators Free Presentations

14.00 Visual sensitivity in migraine: development and validation of the Visual Sensitivity Questionnaire.

Amir H. Zamanipoor Najafabadi (NL)

14.15 **Visual sensitivity is more** enhanced in migraineurs with aura than in migraineurs without aura.

Matthijs J.L. Perenboom (NL)

14.30Trigeminovascular duralvasodilation is affected in Familial HemiplegicMigraine type 1 knockin mice.

Kayi Y. Chan (NL)

14.45 **Detoxification in medicationoveruse headache, a retrospective controlled follow-up study: Does care by a headache nurse lead to cure?** 

JA Pijpers (NL)

15.00 In vivo and in vitro vascular characterization of a novel transgenic mouse model of migraine.

Khatera Ibrahimi (NL)

15:15-15:45 **Tea break** 

15.45 Non-invasive intracranial pressure monitoring with transcranial Doppler ultrasonography.

Benjamin R Wakerley (UK)

16.00 Efficacy of Multiple Cranial Nerve Blocks in Primary Headache Syndromes: A Prospective Open Label Analysis.

Susie Lagrata (UK)

16.15 **Therapeutic Effect of Intranasal Evaporative Cooling in Patients with Migraine. A Report of the Results of the Cool Head 1 Study.** Jitka Vanderpol (UK)

16.30Occipital Nerve Stimulation inHighly Refractory Chronic Headaches:

**Identification of Possible Predictors of Success.** Sarah Miller (UK)

16.45 **Headache determines Quality of Life in Idiopathic intracranial Hypertension** Keira A Markey (UK)

17:00 ANNUAL GENERAL MEETING (ADMA members only)

18:00 Close

### Morning session-Abstracts

# Opening of the $25^{\text{TH}}$ Anglo Dutch Migraine Association.



Professor Miguel Láinez is professor neurology at Valencia Medical School. He was EHF president and the co chair of the IHC this year in Valencia.

## ANGLO-DUTCH DUO PRESENTATION. "Do we know what we don't know?"



Peter Goadsby is Director of the Wellcome Trust Clinical Research Facility and Professor of Neurology at King's College, London. He has been the recipient of many awards and honours over the last thirty years, including President of the International Headache Society, and sits on the editorial boards of more than a dozen international journals. He played a pivotal role in the studies that demonstrated the fundamental nature of the migraine mechanism and in the delineation of the trigeminal

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autonomic cephalalgias, and has been the seminal influence in the development of experimental models of headache and the understanding of treatment effects.



Michel D. Ferrari, MD, PhD, FANA, FRCP is Professor of Neurology and Chair of the Leiden Centre for Translational Neuroscience at Leiden University Medical Centre (LUMC), President of the Dutch Headache Society, and past President of the International Headache Society (IHS). He received his MD (1980), his specialty certificates in Neurology and Clinical Neurophysiology (1985) and his PhD (1992) on "Serotonin and

Migraine" (supervisors: George Bruyn & Pramod Saxena) *cum laude* from LUMC. He serves on executive and scientific boards of many scientific organisations, is Associate Editor of Cephalalgia and Headache Currents, Senior Associate Editor of Headache, and a regular peer reviewer for various scientific journals. He has organised several international congresses, incl. the 1997 IHS World Conference in Amsterdam, and has co-authored many books and over 500 peer-reviewed publications on the neurobiological, genetic, clinical and therapeutic aspects of migraine, cluster headache, ataxia, and epilepsy. He ranks among the global top three most cited scientists on "Migraine and Other Vascular Headaches". His landmark paper on the first migraine gene (Cell 1996) is the highest cited paper in the field. In 2015 his personal profile was highlighted in Lancet Neurology.

## ANGLO-DUTCH MIGRAINE ASSOCIATION 1991-2015. Facts and memories

Peter Koehler MD PhD, is a general neurologist, responsible for the neurology training programme, in Atrium Medical Centre, Heerlen, The Netherlands with special interest in neurooncology and headache, both subjects in which research resulted in a number of papers (see PubMed). Furthermore he is interested in the history of neurology / neurosciences. From 1999-2003 he was President of the Netherlands Society of Neurology. From 2003-2010 he was editor of the neurology section of the Nederlands Tijdschrift voor Geneeskunde. He is editor-in-chief of the Journal of the History of the Neurosciences, past-chair of the History Section of the American Academy of Neurology and History Section Editor of Cephalalgia. He



published books among others on Neurological Eponyms and on Brown-Séquard, as well as papers on the history of neurology, in particular on the history of headache/migraine.

### Anglo-Dutch Migraine Association 1991-2015. Facts and memories

In the year that Boris Yeltsin dissolved the communist party of the Soviet Union, John Major (UK) and Ruud Lubbers (NL) were prime ministers, and we paid with

pounds and guilders, two migraine researchers, Tim Steiner and Leon Hogenhuis, discussed plans to found an association for the study of migraine. They believed that England and the Netherlands had a 'similar approach' in dealing with headache and migraine. They realized it was about time for 'combining forces ...[to] improve the effectiveness for our efforts to ease the lot of the migraine sufferer' not in the least because of the 'rapid expansion in the field'. Their efforts resulted in the formal inauguration of the Anglo-Dutch Migraine Association (ADMA) the first meeting of which was organized in Maastricht in 1991. Throughout the years the ADMA appeared a successful medium to present ideas, research in progress or study results. Young investigators found a platform to present and although some left, many stayed and are now recognized investigators in the field. Meetings were organized in interesting places in the United Kingdom and the Netherlands. New ways of presenting (junior session, debate session, Marcia Wilkinson lecture, breakout session, Ed Chronicle Bursary Lecture, invited speakers' session) were introduced, many of which became a regular part of the annual meetings. Proceedings of the meetings were published and up to the 2007, ten volumes have appeared containing presentations of 17 meetings. Since 2008, presentations were published online, after the ADMA-website was launched. although the willingness to write a paper seems to have diminished. In contrast the number of photographs increased. demonstrating that the cohesion of the group became more tight. Many aspects of headache and migraine were discussed throughout the past 25 years, including the introduction in 1991 of sumatriptan, clinical aspects of various types of headache, pharmacological and psychological facets. The evolution of genetic aspects and pathophysiological mechanisms were often commented upon. Other recurrent themes were headache in women and children, headache in first line practice and headache clinics. Historical subjects were also presented. Social and cultural aspects were not neglected during the ADMA meetings. Scarves and ties for members were designed and worn during meetings. During the first years the social program often contained plays and ballet, but musical performances gradually gained popularity. City walks were rarely lacking on the program. Friendships among the members started and we mourned over the loss of several members who deceased. Anno 2015 we still pay with pounds (UK), but also with Euros (NL). Many aspects with respect to diagnosis and treatment headache and migraine did not change; others did. After the first meeting of the ADMA in Maastricht (1991), we could not imagine we would celebrate the 25th meeting of an Association that has become so successful. With the present solid base, however, we trust there will be a 50th meeting of the ADMA in 2040.

### **SPECIAL PRESENTATION OF ADMA FOUNDER**



Professor Timothy Steiner is Professor of Medicine (Headache and Global Public Health) at the Norwegian University of Science and Technology, Trondheim, Norway. He is also qualified in law and in business management. He has worked in the field of headache medicine for over 35 years, in particular the public health aspects of headache, bringing recognition to the enormous disability and other burdens attributable to headache disorders. He founded

the UK-registered charity, Lifting The Burden, which conducts the Global Campaign against Headache in official relations with the World Health Organization. With Dr Leon Hogenhuis, he cofounded the Anglo-Dutch Migraine Association in 1991

The Global Burden of Disease Study 2010 (GBD2010) established tension-type headache and migraine as the second and third most prevalent disorders in the world (after dental caries) and migraine as the seventh-highest specific cause of disability. It may not be surprising, therefore, that headache is one of the most frequent reasons for medical consultation in both primary care and neurological practice in almost all regions of the world, a message clearly expressed in Atlas: Country Resources for Neurological Disorders, published jointly by WHO and WFN in 2004. Yet headache ought not to be a frequent cause of visits to hospital and certainly not to the emergency room. The fact that it is in many places indicates a failure of health services to provide effective headache management in primary care.

### **THE 23ST MARCIA WILKINSON LECTURE**



Alan M. Rapoport MD is a Clinical Professor of Neurology at The David Geffen School of Medicine at UCLA, Los Angeles, California, where he teaches medical students, neurology residents and fellows. He is the President of the International Headache Society (IHS) and the founder and Director-Emeritus of The New England Center for Headache, in Stamford, Connecticut. Boardcertified in Neurology and Headache Medicine, he has coauthored more then 300 articles,

chapters and posters on headache and other neurological diseases. He has lectured around the country and internationally to general physicians and headache specialists on all aspects of headache pathophysiology, diagnosis and treatment and has appeared many times on national radio and television programs, such as Today and Good Morning America.

He is an editor of Headache, CNS Drugs and Editor in Chief of Neurology Reviews. He reviews for many peer-reviewed journals such as Cephalalgia, Neurology, New England Journal of Medicine and Headache.

He has co-authored nine books on headache for patients, physicians, and nurses with Drs. Fred Sheftell and Stewart Tepper.

He is the Co-Founder of BonTriage, an IT company in Silicon Valley, California, dedicated to improving the practice of medicine around the globe by collecting detailed histories on line and linking with an app that monitors patient progress and outcomes. The company has started with headache and is moving into sleep, depression, anxiety, chronic pain and other areas.

Dr. Rapoport has served on the Board of Directors of the American Headache Society (AHS) and is the immediate past President of the Fairfield County Neurological Society (Connecticut), the Founding President of the Headache Cooperative of New England (HCNE), the Founding Director of

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the Headache Cooperative of the Pacific (HCOP) and until June 2011 was the Chairman of the Education and Membership Committee of the International Headache Society (IHS). He is currently a member of the Board of Trustees of the International Headache Society. His presidency began during the IHC in Boston on June 27, 2013.

#### The 23th Marcia Wilkinson Lecture

Doctor Marcia Wilkinson was a very special person and a true giant in the field of British Headache Medicine in the 20th Century. I was fortunate to meet her at the AHS Scientific meeting in Boston in 1979, 3 years prior to the formation of the IHS. She became a close friend of mine and mentor during most of my career. I spent many hours with her at meetings and on social trips adjacent to international meetings. We stayed in each others homes on multiple occasions. She knew my wife and 3 children well, and I knew her 2 daughters and her grandchildren. Her brilliance, whit, spunkiness, unbelievable energy, attitude about life and many other attributes influenced my life significantly. I visited her in her last home next to the barn in Hertfordshire only a few months before the start of the medical issues that preceded her death. I shall forever remember her as one of the most special people in my life.

Marcia taught us all about minimalist treatment of the migraine attack, as evidenced by the standard treatment she and Nat Blau instituted at the City of London Migraine Clinic. She also insisted that the headache specialist be the first person to take the headache history and that nurses would just adulterate the true history. I argued about these approaches with her at times, but could never sway her over to my side, as she was not wrong in her approach. So I gradually developed my own techniques to care for the patient, which differed in part with hers. I will detail both ways and show my way, part of which was just published in Cephalalgia and presented last month at the American Academy of Neurology in Washington, DC by the first author, a young Ethiopian Neurologist named Yohannes Woldeamanuel.

### Afternoon session-Abstracts

# The Next Generation: Young Investigators Free Presentations

# Visual sensitivity in migraine: development and validation of the Visual Sensitivity Questionnaire

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2Tergooi Hospitals, Hilversum, the Netherlands

Background

Up to 60% of migraineurs report abnormal interictal visual sensitivity to patterns, light, or both. A well-validated questionnaire to quantify visual sensitivity is lacking. Aim

To develop a Visual Sensitivity Questionnaire (VSQ) and to assess its internal consistency, test-retest reproducibility, and external validity.

Methods

We developed a 9-item questionnaire (5-point Likert scale) to assess interictal sensitivity to light and patterns. The questions were based on information from the literature, interviews with migraineurs, and migraine forums on the internet. Internal consistency for the VSQ was tested with Cronbach's  $\alpha$  and itemtotal correlations. Test-retest reproducibility was assessed with intra-class correlation coefficient (ICC) (two weeks to one year later). For external validation the sum score of the VSQ was correlated with the pattern glare test (general illusion index) and the light sensitivity test (light discomfort threshold), using spearman's rho.

Results

A total of 165 migraineurs completed the VSQ. Internal consistency assessed with Cronbach's  $\alpha$  was 0.85, item-total correlations ranged between 0.45 and 0.71. Test-retest reproducibility (n=52) assessed with ICC was 0.93. There was a significant correlation between the VSQ sum-score and the general illusion index (n=82, rs:0.452, p<0.001) and the VSQ

sum-score and the light discomfort threshold (n=27, rs:-0.462, p<0.001).

Conclusions

The newly developed VSQ has an excellent internal consistency and reproducibility, and a good external validity. We demonstrated its ability to assess light and pattern sensitivity in migraineurs. The Visual Sensitivity Questionnaire is easy to use and allows future research on light and pattern sensitivity in larger populations.

# Visual sensitivity is more enhanced in migraineurs with aura than in migraineurs without aura

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2. Dep of neurology, Tergooi Hospitals, Hilversum, the Netherlands

### Background

Migraine is often accompanied by sensitivity for light and patterns. This is usually interpreted as manifestation of 'cortical hyperexcitability', as is the migraine aura. It is not known if migraineurs with and without aura differ in visual sensitivity. Aim

To quantify ictal and interictal visual sensitivity of migraine patients with and without aura using the Visual Sensitivity Questionnaire (abstract Zamanipoor et al), a self-report scale quantifying sensitivity to light and patterns. Methods

Migraineurs with (MA, n=89) and without (MO, n=76) aura completed the VSQ twice: to assess visual sensitivity a) outside and b) during attacks of the last month. VSQ sum-scores were compared between MA, MO and healthy controls (n=99). Results

We found differences in VSQ score between controls and MA and MO outside attacks using one-way ANOVA (F(2,264)=48.4, p<.0001). Tuckey post-hoc testing revealed that scores of MA (12.1±6.3) and MO (9.00±5.6) were higher than of controls (4.6±3.4, both p<.0001). Outside attacks MA also scored

significantly higher than MO (p<.001). VSQ score increased during an attack compared to outside an attack for MO (18.6±7.7) and MA (21.8±6.7, paired t-test, both p<.0001). In addition, the score for MA during an attack was higher than for MO (unpaired t-test, p=.004).

Conclusions

Migraine patients with aura report enhanced visual sensitivity to light and patterns compared to patients without aura, both outside and during the attacks. This suggests cortical hyperexcitability may be more severe in migraineurs with aura compared to those without aura.

### Trigeminovascular dural vasodilation is affected in Familial Hemiplegic Migraine type 1 knockin mice

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Background: Neuronal hyperexcitability has been shown in transgenic knockin mice carrying the familial hemiplegic migraine type 1 (FHM1) mutations in the Cacna1a gene. However, the effects of FHM1 mutations on the trigeminovascular system and the release of neuropeptides are largely unknown.

Aim: To investigate the effect in knockin mice with the R192Q mutation on dural vasodilation induced by endogenous and exogenous calcitonin gene-related peptide (CGRP) in a mouse closed cranial window model.

Method: R192Q and wildtype mice were prepared for intravital microscopy on a closed cranial window (N=11-16/group).

Vasodilation to endogenous (released by  $30 \mu g/kg$  capsaicin, iv) or exogenous ( $10 \mu g/kg$ , iv) CGRP was studied by measuring the change in dural artery diameter. This study is approved by the ethics committee of the Erasmus Medical Center in Rotterdam Results: Baseline dural artery diameter values were comparable in all groups. Capsaicin significantly induced vasodilation in the wildtype ( $88\pm4$  AU vs  $40\pm3$  AU) and R192Q ( $53\pm6$  AU vs  $31\pm4$ 

AU) mice. CGRP induced significant vasodilation in wildtype mice (68±6 AU vs 37±6 AU) and a trend in R192Q mice (46±9 AU vs 34±5 AU). The  $\Delta$  effects (effect-baseline) induced by capsaicin and CGRP were significantly higher in wildtype (capsaicin: 48±5 AU, CGRP: 31±7 AU) compared with the R192Q (capsaicin: 22±4 AU, CGRP: 11±5 AU) mice.

Conclusion: These results demonstrate that FHM1 mutations when expressed in knockin mice affect CGRP-induced vasodilation in the trigeminovascular system. Thus, FHM1 mutations do not only affect the central aspects of migraine pathophysiology, but also the trigeminovascular components.

#### Detoxification in medication-overuse headache, a retrospective controlled follow-up study: Does care by a headache nurse lead to cure?

JA Pijpers, MD\* (1), MA Louter, MD\* (1,2), ME de Bruin (1), EW van Zwet, PhD (3); FG Zitman, MD, PhD (2); MD Ferrari, MD, PhD (1) GM Terwindt, MD, PhD (1)

\* These authors contributed equally to the manuscript

Abstract

Aim To determine whether support by a headache nurse in the treatment of medication-overuse headache (MOH) increases successful withdrawal, and to study determinants of response to withdrawal therapy.

Methods A retrospective controlled follow-up study was performed with 416 MOH patients. All patients were treated with outpatient withdrawal therapy, with two treatment arms: with or without the support of a specialized headache nurse. The outcome measures were: i) successful withdrawal, defined as discontinuation of all headache medication according to the study protocol; and ii) the responder rate, defined as the percentage of patients with  $\geq$  50% reduction in headache days after successful withdrawal and iii) relative reduction in headache days after successful withdrawal.

Results Successful withdrawal percentages were significantly higher in the group supported by the headache nurse than in the group without support (73.1% vs. 60.7%; p=0.008), which was confirmed in multivariate analysis (OR 1.73, 95% CI 1.11-2.71, p=0.016). Support by a headache nurse was not associated with response. The underlying headache primary headache diagnosis, determined after withdrawal, was significantly correlated with response.

Conclusion The support by a headache nurse results in an increased adherence to detoxification.

# IN VIVO AND IN VITRO VASCULAR CHARACTERIZATION OF A NOVEL TRANSGENIC MOUSE MODEL OF MIGRAINE

KHATERA IBRAHIMI1, ROSELIN R. KLEVER2, SIENEKE LABRUIJERE1, KAYI Y. CHAN1, RENÉ DE VRIES1, RICHARD VAN VEGHEL1, A.H. JAN DANSER1, ELSE A. TOLNER2, ARN M.J.M. VAN DEN MAAGDENBERG2, ANTOINETTE MAASSENVANDENBRINK1

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Background

Migraine is an important cardiovascular risk factor and is a prominent feature in Retinal Vasculopathy with Cerebral Leukodystrophy (RVCL), a rare monogenic small vessel disease caused by mutations in TREX1, encoding for a 3'-5' DNA exonuclease. It is not known whether TREX1 mutations affect vascular function.

Aim

With a novel knockin transgenic mouse model containing a truncating TREX1 mutation, we investigated vascular changes in relation to the pathogenesis of migraine. Methods

We characterized the macrovascular function of these transgenic mice in vitro. Using myographs, relaxations to acetylcholine were measured in isolated aortae. The in vivo microvascular characterization was executed by post-occlusive reactive hyperaemia (PORH) measurements of the hindpaw by laser Doppler flowmetry. For both the in vitro and in vivo measurements, we included animals of 13, 26, 52 and 100 weeks of age.

Results

In the in vitro studies, acetylcholine induced lower relaxations in the aortae of the 100 weeks old transgenic (Emax: $35\pm7\%$ , n=8) than in the wild type (Emax: $56\pm7\%$ , n=8, p=0.05) mice. No other

differences between wild type and transgenic animals were observed in the in vitro studies. However, in the in vivo experiments, the PORH responses were significantly attenuated in the animals with the TREX1 mutation across all age groups [F(1,66)=5.4, p=0.023]. Histopathological analyses of RVCL mice retina, skin, kidney and brain are ongoing. Conclusions

Our analysis is suggestive of vascular abnormalities in this monogenic RVCL model, which may be assigned to decreased endothelial function, especially in the microcirculation. The model is a promising tool to study vascular mechanisms of migraine pathophysiology.

# Non-invasive intracranial pressure monitoring with transcranial Doppler ultrasonography.

Benjamin R Wakerley, consultant neurologist, Gloucester Royal Hospital, UK

Assessment and monitoring of intracranial pressure (ICP) remain important in the management of both neurological and neurosurgical conditions. Transcranial Doppler (TCD) ultrasonography is a non-invasive bedside test that can evaluate cerebral blood flow haemodynamics in major intracranial arteries. Cerebral blood flow velocities and spectral characteristics obtained by TCD have been described to correlate with ICP. TCD-derived pulsatility index (PI), calculated as the difference in flow velocities measured during systole (Vs) and diastole (Vd), divided by the mean flow velocity (Vm) [(Vd-Vs)/Vm], is believed to be positively influenced by ICP. Although the relationship between TCD-derived PI and ICP is complex and dependent on a number of physiological factors and disease states, there is increasing evidence that it may prove useful in the future as means of monitoring ICP non-invasively.

Efficacy of Multiple Cranial Nerve Blocks in Primary Headache Syndromes: A Prospective Open Label Analysis 1Lagrata Susie, 1,2Miller Sarah, 1,2 Matharu Manjit 1Headache Group, National Hospital for Neurology and Neurosurgery, Queen Square, London 2Institute of Neurology, University College London, National Hospital for Neurology and Neurosurgery, Queen Square, London

#### Introduction:

Greater occipital nerve block (GONB) is an established treatment in headache management. Multiple cranial nerve blocks (MCNB) of the supra-orbital, supra-trochlear, auriculo-temporal and greater/lesser occipital nerves are an option for those patients failing to respond to GONB.

#### Aim:

To prospectively assess the efficacy and side effect profile of MCNB in a cohort of primary headache patients.

#### Methods:

Patients in our unit failing to respond to GONB who were then treated with MCNB were prospectively studied. Data on headache characteristics were collected using headache diaries recorded before and after the MCNB. Adverse event data was also collected. A positive response to treatment was taken as a 50% or more reduction of headache load for at least ten days post-procedure. Headache load was calculated using the formula

 $\sum$  (attack duration [hours] x attack severity [verbal rating

score]).

Results:

93 patients underwent 102 MCNB procedures. A response was observed in 54% (n=55) of MCNB with 30% (n=31) resulting in pain freedom at ten days. Response rates by phenotype is shown in Table 1. The mean duration of response was 44 days (range 10-261 days). 45% (n=26) of those who had no response to any GONB showed a positive response to MCNB. There was a transient worsening of headache in 6% and immediate but transient dizziness reported after 17% of procedures. Conclusion:

MCNB appears to be an efficacious and well-tolerated transitional treatment in headache patients. A negative response to GONB does not appear to be a predictor of response to MCNB.

Table 1:PhenotypeResponse Rate (n)Chronic Migraine (n=33)27% (n=9)Cluster Headache (n=42)67% (n=28)

SUNCT/SUNA (n=13) 85% (n=11) Hemicrania Continua (n=5) 100% (n=5) New Daily Persistent Headache (n=9)11% (n=1) SUNCT, Short Lasting Unilateral Neuralgiform Headache Attacks with Conjunctival Injection and Tearing; SUNA, Short Lasting Unilateral Neuralgiform Headache Attacks with Autonomic Features

# Therapeutic Effect of Intranasal Evaporative Cooling in Patients with Migraine.

A Report of the Results of the Cool Head 1 Study.

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Background

Cryotherapy is the most common non-pharmacological painrelieving method used to treat migraine headache. Studies have previously demonstrated effectiveness of a variety of cryotherapy approaches. Intranasal evaporative cooling due to vascular anatomy, allows the transfer of venous blood from nasal and paranasal mucous membranes to the dura mater, thereby providing an excellent anatomical basis for the cooling processes. The aim of this pilot study was to ascertain whether intranasal evaporative cooling may be an effective and safe intervention in an acute migraine attack Methods

We conducted an in-hospital, single-centre, prospective, openlabel, observational, pilot study. A total of 20 treatments were administered in 15 patients who satisfied the International Classification of Headache Disorders (ICHD 2) diagnostic criteria for migraine. All patients provided pain severity scores and migraine-associated symptoms severity scores (based on a 0-10 visual analogue scale (VAS). Migraine VAS pain scores were extrapolated to provide a categorical scale of pain intensity using the Glaxo-scale of Severe, Moderate, Mild and None. Data were analyzed using SPSS version 20.0 using paired sample T-test and the  $\chi$ 2 test. Shapiro-Wilks and Friedman's non-parametric test were used to test the validity of the pain and symptom severity scores.

Results

Out of the 20 treatments, intranasal evaporative cooling rendered patients' pain and symptoms free immediately after treatment in 8 of the treatments (40%) and a further 10 treatments (50%) resulted in partial pain relief (headache reduced from severe or moderate to mild) and partial symptoms relief. At 2 hours, 9 treatments (45%) provided pain and symptom freedom, with a further 9 treatments (45%) resulting in partial pain and symptoms relief. At 24 hours, 10 treatments (50%) resulted in patients reporting pain and symptom freedom and 3 (15%) provided partial pain relief. When examining data on a 'per patient' rather than 'per episode' basis, 13 patients (87%) had benefit from the treatment within 2 hours, that was sustained at 24 hours.

Reduction in both pain severity and migraine associated symptom severity score from baseline to each time point was statistically significant ( $p \le 0.001$ ) representing a consistent downward trend in both pain and symptoms score.

When asked how Intranasal cooling compared to current rescue medication taken, 9 patients (60%) stated that intranasal cooling was better and 4 (27%) stated the response was as good as their current rescue medication.

This study did not reveal any significant or severe side effects and any that were reported were mild and rapidly subsided spontaneously without the need for any treatment. Conclusions

This study showed that intranasal evaporative cooling gave considerable benefit to patients with migraine, improving headache severity and migraine-associated symptoms. Nasal cooling was well tolerated by the majority of the participants and we found that intranasal cooling was safe to use for this indication. An adequately powered randomised controlled study will be required to confirm the potential of this application in the management of migraine.

### Occipital Nerve Stimulation in Highly Refractory Chronic Headaches: Identification of Possible Predictors of Success

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2Institute of Neurology, University College London, National Hospital for Neurology and Neurosurgery, Queen Square, London 3 Department of Neurosurgery, National Hospital for Neurology and Neurosurgery, Queen Square, London

Introduction:

Occipital nerve stimulation (ONS) has emerged as a promising treatment for refractory chronic headaches. The procedure is invasive and expensive while response rates vary between studies. Identification of clinical predictors of outcome is therefore of great clinical relevance.

Aim:

To prospectively assess the efficacy of ONS in a cohort of intractable chronic headache patients and to identify clinical predictors of response.

Methods:

165 patients undergoing ONS at a single centre between 2007-

2013 were studied. Headache load (2 week  $\Sigma$ (attack duration

[hours] x attack severity [verbal rating score]) was calculated at baseline and final follow-up. A positive response was defined as a 30% reduction in headache load. A multivariate logistic regression analysis was carried out to identify possible predictors of outcome.

Results:

Patient group was highly refractory at baseline and 22% suffered from multiple headache types. At a mean follow up of 40 months ( $\pm$ 28 months) the response rate of the group was 50%. Clinical factors identified with an increased likelihood of response were co-existent chronic migraine and chronic cluster (OR 4.44, p=0.04) and the presence of non-headache related pain disorders (OR 2.08; p=0.05). Occipital pain was associated with a reduced likelihood of response (OR 0.44, p=0.04). Adverse event rates were favourable compared to previous reports. Conclusion:

ONS appears to be a potentially useful and safe treatment in highly refractory chronic headache disorders. The presence of

multiple pain syndromes appears associated with increased likelihood of response and presence of occipital pain with a reduced likelihood.

# Headache determines Quality of Life in Idiopathic intracranial Hypertension

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#### Abstract

Background: The effect of idiopathic intracranial hypertension (IIH) on quality of life (QOL) is poorly understood. Our objectives were to compare QOL in IIH to the normal UK population; to investigate QOL changes with treatment of IIH, using a weight loss intervention, and to determine which clinical factors influence QOL.

Methods: This was a prospective cohort evaluation of QOL, using the 36-Item Short Form (SF-36) Health Survey questionnaire, before and after a therapeutic dietary intervention which resulted in significant reduction in body mass index (BMI), intracranial pressure (ICP), papilloedema, visual acuity, perimetric mean deviation (Humphrey 24-2) and headache (sixitem headache impact test (HIT-6) and headache diary). Baseline QOL was compared to an age and gender matched population. The relationship between the clinical outcomes to change in QOL was evaluated.

Results: At baseline, QOL domains were significantly lower in IIH compared to an age and gender matched population, p<0.001. Therapeutic weight loss led to a significant improvement in 7 out of 11 QOL domains in conjunction with the previously published data demonstrating significant improvement in papilloedema, visual acuity, perimetry and headache, p<0.001, with large effect

sizes. Despite significant improvement in clinical measures only headache correlated significantly (p<0.001) with improving QOL domains.

Conclusions: QOL in IIH patients is significantly reduced. It improved with weight loss alongside significant improvement in clinical measures and headache. However, headache was the only clinical outcome that correlated with enhanced QOL. Effective headache management is required to improve QOL in IIH Save the date for the next ADMA meeting in Dordrecht (NL):

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