EDITORIAL

The Twenty-sixth Annual Meeting of the International Tinnitus Forum, September 20, 2008, Chicago, IL

The Twenty-sixth Annual Meeting of the International Tinnitus Forum (ITF) was successfully completed in Chicago, Illinois, prior to the annual meeting of the American Academy of Otolaryngology–Head and Neck Surgery (AAO-HNS). Barbara Goldstein, PhD, coordinator of the meeting, greeted the attendees. The meeting marked the fourth occasion of ITF focus on a translational approach (ongoing since 1983) of basic science for the clinical application of tinnitus diagnosis and treatment.

Appreciation was extended to Captain Michael D. Hoffer, MD, and his family for his service in the Navy and present tour of duty in Iraq, which precluded his attendance and presentation. Best wishes were extended to Michael for his safe return and to his family for good health. We look forward to his return to continue his participation in the activities of the ITF and the *International Tinnitus Journal* (*ITJ*).

The theme of this ITF meeting was "Translational Research in Tinnitus Therapy IV—Transcranial Magnetic Stimulation." The gathering marked the first time that principal investigators from three of the five major centers in several countries were able, in a roundtable format, to present and discuss among an audience of tinnitus professionals their involvement with transcranial magnetic stimulation (TMS) attempting tinnitus relief.

As is well known, TMS research for brain function and disorders of the peripheral and central nervous system is not new. Specifically, the clinical translation of the biophysics of magnetic fields has application for tinnitus theory, basic science, diagnosis, and treatment. The clinical application of magnetic fields for the imaging of various regions of the body, which started with magnetic resonance imaging (MRI), has provided information of brain structure to both tinnitus professionals and patients. Functional magnetic resonance imaging has demonstrated multiple neural substrates involved in brain function for specific tasks. Nuclear medicine imaging, such as single-photon emission computed tomography and positron emission tomography, provides indirect and direct evidence of metabolic activity in multiple neural substrates, reflecting multiple brain functions or dysfunctions.

Evidence of technological advances is exemplified in a new scanner from Massachusetts General Hospital, the invention of biophysicists Graham Wiggins and Lawrence Wide. A brain scanner helmet consisting of 96 coils arranged on the surface of the helmet (like the hexagons and pentagons of a soccer ball) minimizes interference between the magnetic fields of the brain and provides visualization at a resolution six times that of the conventional MRI and ten times as fast. Such technology may mean earlier detection of brain function and disease and clinical application for tinnitus patients. Significant for the future of TMS and its clinical application for attempting tinnitus relief is that the US Food and Drug Administration is in the process of evaluating a TMS device for treating depression.

TMS offers to tinnitus professionals the opportunity to identify underlying neural circuitries involved in the neural substrates previously shown by MRI and nuclear medicine imaging. This technology offers clinical translation for tinnitus diagnosis and treatment. Magnetic stimulation may assist in attempts at tinnitus relief by influencing specific neuronal assemblies comprising multiple brain circuitries with underlying multiple involved neurochemistries.

The speakers invited to present at the ITF were all leaders in the field of TMS and tinnitus. They were invited to reflect on and review TMS efforts of the past and present and to project future capabilities for tinnitus diagnosis and treatment. The meeting provided the speakers an opportunity to present their individual experiences to date and their expectations for the future.

The forum included many presentations, a panel discussion, and question-and-answer sessions. Claus F. Claussen, MD, PhD, from the University of Wurzburg and the Neurootologisches Forschungsinstitut der 4-G-Forschung e.V., Bad Kissingen, presented "Tinnitus-Related Changes in Equilibrium Dysregulations Such As Vestibular Recruitment and Decruitment." Erik Viirre, MD, PhD, presented "Advances in Physiologic Techniques for the Characterization of Tinnitus."

Barbara Goldstein, PhD, and I presented a single case report of a 56-year-old man with a predominantly central-type severe disabling tinnitus in whom TMS was

attempted to achieve tinnitus relief. Tobias Kleinjung, MD, presented "Transcranial Magnetic Stimulation for Treatment of Tinnitus: The Regensburg Experience," and John Dornhoffer, MD, presented "Transcranial Magnetic Stimulation for Tinnitus—Prolonging the Response." Summaries of the presentations and primary questions and answers appear elsewhere in this issue of *ITJ*.

Professor Dirk de Ridder from the University of Antwerp was our guest of honor. He is a 1992 graduate of the medical school at the University of Ghent, Belgium, and, on the basis of his thesis, "A Darwinian Neurosurgical Approach to Tinnitus," received a doctor of philosophy degree in medical sciences in April 2005. Dr. de Ridder has been a visiting professor since 2006 in the department of neurosurgery at the University Hospital of Antwerp and was acting head of that department in Antwerp from March 2006 until September 2007. Since March 2008, he has been founder and director of the Brain Research Center at Antwerp for Innovative and Interdisciplinary Neuromodulation. In September 2008, he became the founder and director of the Tinnitus Research Initiative.

Dr. de Ridder's neurosurgical interests include skull base surgery, microvascular decompression surgery, surgery for tinnitus, and electrical magnetic brain stimulation. His many publications of book chapters, papers, and lectures reflect his neurosurgical interests.

The title of Dr. de Ridder's presentation was "Tinnitus: From Basic Science via Noninvasive Magnetic Stimulation to Brain Surgery." It was a high honor for the ITF to have Professor de Ridder as our guest of honor. His outstanding talk alerted us to significant advances in the identification of the pathophysiology of tinnitus that contribute to the understanding of the symptom of tinnitus as a leading sensory symptom manifested clinically via the integration of multiple brain functions. Basic science tinnitus investigation is contributing to the theory, diagnosis, and treatment of all clinical types of tinnitus and the identification of neural circuitries in brain.

The focus of Professor de Ridder's presentation was how the technology of EEG, QEEG, and the Loreta mapping technology can better delineate and improve brain stimulation with TMS or electrical stimulation via implanted electrodes to achieve tinnitus control. In addition, in an attempt to answer the most difficult question—why do not all tinnitus patients respond to TMS with tinnitus control?—we hypothesize that altered activity in the auditory cortex is going to be part of the final common pathway of the generation of the tinnitus.

Dr. de Ridder concluded his presentation by acknowledging appreciation for his coworkers at the University of Antwerp and in the Regensburg group and for the invitation from the Martha Entenmann Tinnitus Research Center (METRC). On behalf of the METRC, Dr. de Ridder was congratulated on an outstanding presentation, which provided basic science pathophysiology support for the original hypothesis of a final common pathway for tinnitus and the association of tinnitus chronicity with hippocampal-parahippocampal activation.

A panel discussion entitled "Transcranial Magnetic Stimulation/Cortical Brain Stimulation/Tinnitus Diagnosis and Treatment" attempted to provide to the attendees basic take-home information of the clinical application of TMS for tinnitus diagnosis and treatment. The panel members included Drs. de Deridder, Dornhoffer, Kleinjung, and Shulman. Participants posed such questions as the following:

- What are the specific criteria for selection of patients for attempting tinnitus relief with TMS?
- Which theory of tinnitus explains tinnitus control with TMS?
- What is your opinion of the results reported of efficacy of TMS for tinnitus relief when interpreted in regard to the placebo effect for tinnitus?
- What changes in the personality of the patient have been observed after magnetic stimulation (e.g., sense of humor, worsening of the depression)?
- What is the source of the equipment used for the qualitative EEG (QEEG) recording? Who performs the test? What is the duration of the test?
- In your experience, what is the difference between electrical and TMS in the brain in TMS tinnitus relief responders and nonresponders?

All speakers were thanked for the excellence of their presentations. The conferees were thanked also for their attendance and were alerted to plans for publication in the 2009 spring issue of *ITJ* the questions and answers presented during the discussion section of the meeting. Attendees were invited to submit questions not answered at the meeting for publication in the *ITJ*. Invitations were extended to the conferees to attend the Neuro-otological and Equilibriometric Society 2009 meeting in Guadalajara, Mexico, April 8–10, 2009, and the Twenty-seventh Annual Meeting of the ITF in San Diego, California, October 3, 2009.

Abraham Shulman, MD, FACS