Neurological Manifestations of Zika Virus Infection: What Neurologists Need to Know

BY AVINDRA NATH, MD, AND JAMES SEJVAR, MD

In recent years, there has been an emergence of several major viral infections with devastating neurological consequences, including West Nile virus, dengue, chikungunya, enterovirus D68, Ebola and now Zika virus. Increased global travel and climate change, leading to changing patterns of vector distribution and behavior, are among the major reasons for the emergence of these infections. Zika virus is the most recent epidemic that is having devastating effects on human populations in affected regions, and is rapidly spreading across the South American continent.

Epidemiology
Zika virus was first identified from a primate in 1947 in the Zika forest of Uganda. The first human cases occurred in Africa and then in Southeast Asia in the 1960s. During the intervening years, Zika virus was associated with isolated cases or small outbreaks mainly in Africa. In 2007, there was an outbreak in Yap, the Federated States of Micronesia, where nearly three-quarters of the population was infected. This represented the largest outbreak of Zika virus infection to that point. In 2013, there was an epidemic in French Polynesia, which was associated with a reported increase in cases of the autoimmune peripheral nerve disorder Guillain-Barre syndrome, although a causal association between Zika virus and Guillain-Barre syndrome was never established. In December 2014, Zika virus was first detected in Brazil. Although it is unknown how it was introduced into Brazil, some hypothesize that a traveler attending the 2014 football/soccer World Cup introduced the virus. The outbreak in Brazil was fast moving and large. Tens of thousands of people became ill, and likely millions of people were infected. Similar to French Polynesia, shortly after the beginning of the Zika virus outbreak, clinicians began reporting larger-than-expected numbers of Guillain-Barre syndrome. Many of these people had neurologic symptoms. The emergence of Zika virus in Brazil has led to outbreaks in other countries in the Americas, Asia and Africa.

Female Aedes aegypti mosquito

Neurological Board Certification in Europe

BY JAN B.M. KUKS

Young neurologists can rise to the challenge in Denmark on May 27, 2016. On that day, the 8th European Board Examination in Neurology will take place in Copenhagen.

Medical specialties in Europe are working together with the European Union of Medical Specialists (UEMS) (www.uems.eu), an organization containing 43 specialist-sections, one of these being the European Board of Neurology (EBN). Setting standards for training and practice is among the organization’s key activities. Therefore, the EBN is involved in developing harmonized models for the high-level training of the next generation of neurologists, in order to improve standards of clinical practice and, hence, patient care throughout Europe. To achieve this, the EBN set up a core curriculum for the training of young neurologists, and — as testing drives learning — a board exam is provided as well.

Professor Wolfgang Grisold, now WFN secretary general, was the founder of this process and organized the first EBN examination in 2009. The 8th examination will take place at the site of the European Academy of Neurology (EAN) Congress. This illustrates the close cooperation between the UEMS Board of Neurology and the Academy of Neurology in Europe, an alliance without which a European training program for Neurologists would not exist.

Education in these times is not only for transferring knowledge, but is also directed toward achieving other competencies.

As in earlier days, the ability to retrieve knowledge from memory may be essential for clinical practice. But don’t we all use electronic devices in our clinics and on our ward rounds to find up-to-date knowledge as soon as possible?
We are pleased and honored to be taking on the editorship of World Neurology, the official newsletter of the World Federation of Neurology (WFN). We would like to thank President Raad Shakir and the officers and trustees of the WFN, as well as the members of WFN’s Publication Committee, for entrusting us with this responsibility. We also wish to give our sincere thanks to Dr. Donald Silberberg for his outstanding editorial leadership of World Neurology for the last three years, as well as for providing the two of us with the benefit and generosity of his ongoing guidance and knowledge as we take on this position, and for having done the work alone that is now deemed necessary for two people to perform.

We have planned a number of new initiatives for the readers of World Neurology, including contributions from authorities on breaking neurological topics that affect neurologist readers worldwide, such as the article in this issue about the Zika virus epidemic from Avi Nath, MD, and James Seyfarth, MD. We also plan to develop new sections and columns over the coming issues to cover such entities as global neurological training and many other topics of interest to all neurologists worldwide.

Our plans for World Neurology include offering additional content formats (e.g., video). We will tighten the interconnection with WFN’s online footages and are currently working on implementing social media into World Neurology. This new feature will provide a convenient way to interact with other readers and discuss our articles.

We look forward to continuing to make World Neurology a trusted and sought-after resource for news and information of interest to all neurologists throughout the globe. We are also happy to field any suggestions from readers about ways to continue to make this publication evolve and be as valuable as possible for all neurologists worldwide.

FROM THE EDITORS

BY STEVEN L. LEWIS, MD, EDITOR, AND WALTER STRUHAL, MD, CO-EDITOR

Trainee Report on WFN Austrian Neurological Society Department Visit Program

BY HANNA DEMISSIE Belay, MD

First, I have the deepest appreciation and gratitude to the World Federation of Neurology and Austrian Neurological Society for endorsing the African Initiative and initiating and supporting the department visit program. I would like to thank Professor Wolfgang Grisold and Professor Eduard Auff for their kind welcome and for hosting me at the Medical University of Vienna in October 2015. I wish to express my sincere thanks to Professor Fritz Zimpich, who was my mentor and made my stay incredibly productive and interesting. I would also like to thank Tanja Wenzhart for effectively arranging my stay from the very beginning up to the end. I thank profusely all the hospital staff of AKH Wien for their kind help and cooperation throughout my stay. I started my visit in the department of neurology with an introduction and warm welcome from all the staff and the head of the department. I started my training on the neurology ward, where, initially, I was overwhelmed by the size and complexity of the hospital. The department of neurology, alone, occupied two floors for inpatient services and another floor for outpatient services.

I spent my first week in inpatient services on the neuromuscular ward and later in the neurorehabilitation unit. I was able to follow acute management of neuromuscular disorders and rare cases, including anti-NMDA receptor encephalitis, which I saw for the first time. I spent a day with the occupational therapists, speech therapists, physiotherapists and other members of the team. I was impressed to see how intense and well coordinated the rehabilitation process was. It further strengthened my conviction that rehabilitation is of utmost importance in the management of many neurological patients. During this time, I was introduced to techniques that I may also apply at my home department. I have decided to try establishing a neurorehabilitation unit in one of the hospitals affiliated with our university. Since my visit, I joined Addis Ababa University in Ethiopia as a faculty member. If successful, it will be the first of its kind in the country.

Among the highlights of my stay was the third week in which I spent in the epilepsy monitoring unit. I observed invasive electrode implantation, and I was lucky enough to attend awake epilepsy surgery. Witnessing something you have had only the chance to read about before was amazing. During the rest of the time, I attended the epilepsy clinic and followed a number of complex epilepsy cases. I spent half days of week three on the electrophysiology units (NCS, EMG, EP and ultrasound). I was impressed to see how useful ultrasound examination could be in the evaluation of many neurological diseases. I plan to collaborate with our colleagues in the department of radiology to eventually establish a similar service at Addis Ababa University, Ethiopia; Dr. Kalpesh Jivan (South Africa) and Professor Wolfgang Grisold, WFN secretary general.
I s there a place for a general neurolo-
 gist? The time has come for us to have a fresh look at our specialty and decide whether we need to modify how we train and practice. In most parts of the world, the answer to the question is simple: We need to continue to train general neurologists to cover a huge need. There are so few of us, that we cannot afford the “luxury” of subspecializa-
tion. However, in a minority of countries, the field has expanded to the degree that subspecialization is the norm. The issue is that, in a diverse situation, for the vast majority of the world population, we are only providing basic neurological care. Do we have to accept the less opti-
mal situation, or should we push hard for subspecialization to happen worldwide?

There is no doubt that in many parts of the world, the idea of a general neuro-
ologist is fast receding. The argument is that the enormous change in practice and the need to be able to deal with complicated issues is far beyond the capability of a generalist. The explosions in genetics and imag-
ing have led to the need for an in depth knowledge of a rapidly changing field. The generalist can decide on the primary clinical presentation and then advising on management. The field is even more complex with the availability of surgical interventions. It is true that a general neurologist is fully able to make a correct diagnosis of rather complicated Parkinsonian syndromes, but when it comes to management on the field of deep brain stimulation or Dusdopa therapy, then expertise in the field is man-
datory. This makes the need for specialist referral centers necessary if we are to offer full treatment packages to patients.

The diagnosis and management of genetically derived disorders is another major area for the specialist. The general-
list is in many cases able to decide on the clinical phenotype, but that will need a further in depth look at the genetics and will require a neonatogenetics to give advice on mode of inheritance and progression following appropriate DNA analysis. This is not an area to venture into without full training in clinical genet-
ics, especially if there are predictive tests in healthy carriers and the implications of that on life and childbearing in future generations.

The most important issue perhaps is the increasing possibility of the availability of stem cell and genetic modifi-
cations in combating many neurological conditions.

Many CME programs are aimed at updating the neurologist in dealing with the conditions faced in daily practice. If we look at the programs of the major in-
ternational, regional and national neuro-
logical congresses, we see that specialists in various fields impart their knowledge and advice to general neurologists. This has led to a plethora of guidelines, with which neurologists are being bombarded, and, at times, it is very difficult to apply the most up-to-date pathways to every problem faced. These guidelines are aimed at practitioners in general, but in most parts of the world the contained technologies are, by and large, not avail-
able and therefore the supposed “best practice” is not applicable. This means that many neurologists looking after huge populations, however diligent they may be in keeping abreast of the latest guidelines, are totally unable to follow them and subsequently, their patients are disadvantaged.

Logically, it follows that postgradu-
ate teaching material and guidelines have to take into account the fact that not all that is most up to date is applicable in all situations. The requirement of obtaining enough annual CME is only effective if it is targeted to the individuals concerned.

The general neurology societies and continental associations have to produce guidelines which are for the general neu-
rologist, and which may well be different in a way to those targeting the specialists in the field. This is rather difficult and may lead to confusion and errors.

Unfortunately, in many parts of the world, there is little opportunity for patients to see the neurologist of their choice. This is very common in both resource rich and poor countries. The healthcare systems in many, if not the majority of resource rich settings, provide neurological care in an anonymous way, and the patient referred with a specific problem may be seen by a general neu-
rologist or by someone with a different special interest. In the grand scheme of things, this does not matter as neu-
rologists know their field and can ask for advice as and when required.

However, in resource poor settings, the way in which patients can be seen by neurologists varies considerably. Some neurologists sit in crowded outpatient clinics, where tens of patients wait in line, and where it is only possible to give each of them only a minuscule amount of time. In some settings, this is compensat-
ed for by the availability of inpatient beds, and what may seem like a complicated problem in the crowded outpatient setting can be admitted for a more detailed evaluation and more thorough investigation.

In other settings, neurology is by and large an outpatient service, with large, short-stay and smaller long term inpatient facilities that vary according to locality and country. Looking after long term disabled patients is dependent on the availability of ancillary services. Neuro-
logical rehabilitation is a separate spe-
cialty, which is totally dependent on the close collaboration with physiotherapists, occupational therapists, speech and lan-
guage therapists, neuropsychologists and neurology nurse practitioners. Without that, delivery of a comprehensive pack-
age of care is not really complete. This approach may not satisfy the expectations of patients who, in the age of the smartphone, have access to the latest advances and will demand care, which may not be possible in their settings. This may well be useful for neurologists, as it will create pressure on health authorities to provide financial and manpower support to achieve better results. This is why it is crucial to work with patients’ groups to push for change at all levels.

Now we have to come to the crux of the matter. Alternately, should we decide that the deficiencies we face are so enormous that we are insurmount-
able and we have to get on with improv-
ing what we have and let slow evolution take its course? There is probably some truth in the latter view as the financial cost across the world is so vast, that we have to keep plugging away with our programs and slowly increase the number of neurologists in resource poor settings, eventually leading to specialization in our field and reducing the huge treatment gap that now exists.

To answer the question raised in the first paragraph, for the time being, it is a clear, yes there is a place for a general neurologist.

Apply for Junior Traveling Fellowships

By STEVEN L. LEWIS and WOLFGANG GRISSOLD

T his year, the WFN will again offer Junior Traveling Fellowships for young neurologists representing countries classified by the World Bank as low or lower middle income to attend approved international meetings. The deadline for applications is March 15.

In total, there will be 30 awards. Applicants should hold a post not above that of an associate professor and be no older than 45 years of age. Candidates are asked to send the name and dates of the meeting they wish to attend, a CV and bibliography. Applicants must also send a letter of recommendation from the head of his or her department and an estimate of expenses, to a maximum of $1,440. No excess will be granted.

Applicants must actively participate in the meeting they attend (presentation, poster, etc.). WFN also encourages applicants to submit an abstract and attach a copy of the abstract to the application.

WFN’s Education Committee will review all applications and announce the awards soon thereafter.

Dr. Lewis is chair, and Dr. Grissold is co-chair of WFN’s Education Committee.
Report on the 2015 St. Petersburg, Russia, Clinical Neurophysiology and Neurorehabilitation Meeting

BY VLADISLAV VOITENKOV, MD, PHD

The large scientific meeting, Clinical Neurophysiology and Neurophysiology, was held by the Scientific Research Institute of Children’s Infections in St. Petersburg, Russia, November 26-27, 2015. Held at the Moskovskoe Vorota Congress Center in St. Petersburg, the event attracted 393 participants. The scientific program was dedicated to general problems of neurophysiology in Russia, Commonwealth of Independent States countries and the European Union, and to certain methods in neurophysiology and neurorehabilitation. The congress hosted plenary lectures and 10 symposiums in all. Plenary lectures included such themes as modern aspects of meningitis and encephalitis treatment and diagnosis in pediatrics, presented by Professor N. Skripchenko of the Scientific Research Institute of Children’s Infections, recent discoveries in the field of transcranial magnetic stimulation (TMS), including TMS-MRI fusion techniques, presented by Dr. B. Neggers, University Medical Center Utrecht Brain Center, the Netherlands, and the role and place of electrophysiology in modern medicine, presented by Professor L. Sumisky, Neurology Center, Moscow.

Symposia themes were vast and issues included scientific and clinical aspects of electromyography, electroencephalography, neurorehabilitation, ultrasonography of the brain, muscles and peripheral nerves, neuro-orthopedics, electrophysiology and audiology, neurorehabilitation and nurses’ education. Special interest was dedicated to the TMS symposium, which gathered more than 100 participants and 12 speakers, including Professor J. Mally of the Institute for Neurorehabilitation in Sopron, Hungary. He presented material on TMS as a diagnostic and therapeutic tool. Professor N. Nazarenko of the Diagnostic Center for Altay Region, Barnaul, Russia presented data on TMS investigation in tick-borne encephalitis and many others.

The previous congress, which took place in 2015 was dedicated to more general topics and had a more classic design. This year’s event was more inclusive of the newest techniques, approaches and more advanced methods.

At the meeting, 126 speakers presented their data on the topics. Symposia included talks from leading Russian and international speakers, as well as presentations from early career researchers whose material has had a significant impact in their fields. Delegates for the congress gathered from Russia, Ukraine, Belarus, Germany, Austria, the Netherlands and Hungary. Russian delegates came from more than 90 locations, including the Far East and Arctic Northern provinces of the country.

The meeting garnered positive and warm feedback from the delegates and speakers. The organizing committee is now deep into the planning of the next event, which will take place in St. Petersburg at the end of November 2016.

Vladislav Voitenkov, MD, PhD, is executive secretary of the Clinical Neurophysiology and Neurophysiology conference, Scientific and Research Institute of Children’s Infections, Federal Medical-Biological Agency of Russia.

The First Arab African Teleneurology Conference: A Treat and Teach Initiative

BY TAMER EMARA, MOHAMED SHERIF, ALWOTTE, MAHAR NABARAA, HAM FADUQ A. MOHAMED, AND AHMED ELBOKL

The Problem

Although ancient Egyptians were the first to describe the brain, the services that are provided to patients with disorders of the brain and the number of trained neurologists in Arab and African countries is at best centralized in large cities and at worst nonexistent.

This occurs despite the argument that the burden of neurologic disorders in the developing world is higher than that in developed countries. In one study from Ethiopia, it was estimated that neurology cases constitute 20-25 percent of ER admissions. Stroke is the No. 1 cause of disability in the world. According to World Health Organization (WHO) records, stroke occurs 20 years earlier in developing countries when compared to developed ones, and only 3 percent of disabled individuals get rehabilitation services. Similarly, 90 percent of epilepsy cases occur in the developing world.

The combined Arab and African population is 1.5 billion, around 25 percent of the world population. With current improvements in vaccination programs and water sanitation, the mean age of the population is increasing, and it is estimated that by 2030, the burden of noncommunicable disorders will be higher than communicable disorders in Africa.

The Situation in Egypt

The number of trained neurologists is steadily growing. Specialized neurology services for stroke, epilepsy, headache, neurorehabilitation, and neuromuscular disorders, among others, are starting and successfully growing. These services can be found in Cairo and to a lesser extent in Alexandria and Assuit. Apart from this, the mere presence of a trained neurologist is an exception. It is a common scenario to find a community of 1 million to 3 million inhabitants who are served by one to two neurology consultants, who may be living in another place and shuttling back and forth. The brain drain happens from these areas to Cairo, in addition to other countries.

The Situation in Africa

Neurology education in many sub-Saharan African countries is almost nonexistent. Around 90 percent of African universities do not have master degrees or other forms of formal training modules in
Successful Training in Neurology in Latin America

BY RICARDO NITRINI, MD

When I was invited to give the presentation “Successful Training in Neurology in Latin America” at the 2015 World Congress of Neurology in Santiago, Chile, I tried to answer the question, “What is the best way to train a neurologist in Latin America?”

To analyze the current situation, I emailed American leaders in neurology, seeking information on graduate courses of medicine, residency programs and the number of neurologists in their countries. Most of my suggestions are based on more than 40 years of experience in clinical practice as a neurologist and in teaching neurology in a Latin American country. So, they are not scientifically proven assertions and should be regarded as a specialist’s opinion.

First, a well-trained Latin American neurologist should be able to provide the best treatment for patients with neurological diseases, teach all medical doctors to treat and recognize the most common neurological diseases that should be referred to neurologists, and research methods of the prevention, diagnosis and treatment of neurological diseases, mainly those that are more frequent in Latin American countries.

First step: Neurology in the Medical School

We need to attract the best medical students to be neurologists.1 To accomplish this, it’s important to fight “neurophobia” during the graduate course. Two main actions are important for this purpose – avoiding teaching excessive techniques of neurological examination in a short period of time and changing the old idea that neurology is great for diagnosis, but not for treatment. Neurologists can do much for their patients and will do much more in the near future.

Most Latin American medical schools do not have neurology departments. The information I received from seven Latin American countries showed that there were only 42 such departments in 307 medical schools, and the teaching of clinical neurological examination has been delivered by both neurologists and other medical doctors in the large majority of these schools. Thus, it’s important for medical schools to establish neurology departments and deliver instruction through trained neurologists.

The formation of Neurologists in Latin America

Most European countries require a four-year minimum of postgraduate training in neurology.1,2 This contrasts with postgraduate training in neurology in Latin American countries (minimum two years in Brazil and three years in the majority). In the U.S., residency programs are three years long (preceded by a year of internal medicine training).3

To more successful training, we need to have longer residency programs (at least three years dedicated to clinical neurology) to incorporate the expanding field of neurological practice. We may also stimulate residents to undertake short-term elective training in other Latin American centers and abroad.

Research

It is essential to improve research on the prevention, diagnosis and treatment of neurological diseases in Latin America, particularly those more prevalent in Latin American countries. Neurologists should be trained during graduate and residency programs on basic aspects of medical research to be able to interpret results and conclusions of papers, and should learn how to submit and publish manuscripts in indexed journals.

More Well-trained Neurologists

The Neurology Atlas (WHO 2004) showed that the median number of neurologists per 100,000 in population varies widely across regions, from 0.03 in Africa to 4.84 in Europe. In the Americas, this figure was 0.89, but there was no specific data from Latin American countries.1 Information I received from 11 Latin American countries showed that this number ranges from 0.3 to 3.7, with a median of 0.9. The appropriate number of neurologists in the population depends upon the structure of a country’s health care system.1 In low-income countries, such as Latin American countries, there are large inequities across regions. In Brazil, for instance, the number of neurologists ranges from less than five in five of the 26 states to more than 280 in four states.4

We need more neurologists, but as is frequent in several regions of the world, there are more applicants than positions for residency training in neurology.4

Conclusions

We need to attract the best medical students to become clinical neurologists, to extend the residency program time, to teach basic aspects of research on clinical neurology during residency programs, and to increase the positions for residency programs in neurology in order to increase the number of well-trained neurologists. To reach this objective, we should develop combined actions of local neurological societies and public health authorities, and also to increase cooperation between Latin American countries and with developed countries.

Acknowledgements

I am grateful for information provided by Drs. Daniel Raúl Zuin, Argentina; Juan Carlos Duran, Bolivia; Renato Verdugo, Chile; German Perez-Romero, Colombia; Guillermo Jiménez, Dominican Republic; Ildefonso Rodriguez Leyva, México; Walter Samuel Diaz, Nicaragua; Fernando Gracia, Panama; Nilton Custodio, Peru; and Santiago Fontiveros, Venezuela. •

References

Portrait of Jan Ingenhousz (1730-1799)

The discovery of ECT has generally been attributed to the Italian psychiatrist Ugo Cerletti (1877-1963), who, in April 1938, managed to induce seizures by applying electricity directly to the head of a schizophrenic patient. Even though Cerletti’s achievement has greatly contributed to the widespread implementation of cranial electrotherapy, the first reports on this seemingly hostile procedure date back even earlier.

The notion that cranial electrotherapy may provide a useful therapy for melancholic patients can be traced back to a letter written by the Dutch scientist Jan Ingenhousz (1730-1799) in 1783. In his letter, Ingenhousz told his correspondent, none other than Benjamin Franklin (1705-1790), of an electric accident that he had recently endured. While Ingenhousz was familiar to Franklin, who had previously suffered an electric blow to the head himself:

“I had a Paralytic Patient in my Chamber, who’s Friends brought him to receive some Electric Shocks. I made them join Hands so as to receive the Shock at the same time, and I charg’d two large Jars to give it. By the Number of those People, I was oblig’d to quit my usual Standing, and plac’d myself inadvertently under an Iron Hook which hung from the Ceiling down to within two Inches of my Head, and communicated by a Wire with the outside of the Jars. I attempted to discharge them, and in fact did so; but I did not perceive it, tho’ the charge went thro’ me, and not through the Persons I entended it for. I neither saw the Flash, heard the Report, nor felt the Stroke. When my Senses returned, I found myself on the Floor. I got up, not knowing how that had happened. I then again attempted to discharge the Jars; but one of the Company told me they were already discharge’d, which I could not at first believe, but on Trial found it true. They told me they had not felt it, but they saw I was knock’d down by it, which had greatly surprized them. On recollecting myself, and examining my Situation, I found the Case clear.”

Just like Ingenhousz, Franklin had not been able to recall the electric accident. Despite monumental blows to their heads, neither of the two men reported any permanent damage. On the contrary, as appears from Ingenhousz’ continuing account, he experienced something quite astonishing the morning after his accident:

“My mental faculties were at that time [the next morning] not only returned, but I felt the most lively joyce in finding, as I thought at the time, my judgment infinitely more acute. It did seem to me I saw much clearer the difficulties of everything, and what did formerly seem to me difficult to comprehend, was now become an easy Solution. I found moreover a liveliness in my whole frame, which I never had observed before.”

Franklin was fascinated by the story of his Dutch correspondent. Ingenhousz had not only survived the accident, but had experienced a considerable improvement in his mood following the accident. Even though Franklin himself had not noticed any perks of his electric mishap, both men agreed that cranial electrotherapy could potentially provide an effective therapy for melancholic patients. Consequently, they both set out to persuade various “mad-doctors” in London and Paris to expose the heads of their melancholic patients to cranial electricity.

In 1787, four years after Ingenhousz’ letter to Franklin, John Birch (1745-1815), an English surgeon and electrotherapist, proclaimed the healing of a melancholic porter and a suicidal singer by means of cranial electrotherapy. Birch’s achievements were soon followed by similar reports from Giovanni Aldini (1762-1834) and T. Gale. Even though none of these physicians made any reference to Franklin or Ingenhousz, given the chronology of events, it seems plausible that the two prominent scientists inspired them.

It is time to include Jan Ingenhousz and Benjamin Franklin in the ECT story. Ingenhousz, a talented physician-scientist best known for his discovery of photosynthesis, was the first to report the positive effects of cranial electricity and to advise the procedure for the treatment of melancholic patients. Franklin, already widely celebrated for his electric research, owns his share in the conception of cranial electrotherapy, as well. Finally, even though Cerletti was probably the first to induce seizures by means of cranial electricity, the early cranial electrotherapists Birch, Aldini and Gale deserve credit for pioneering cranial electrotherapy.

Sources


Illustrations of melancholic patients treated with cranial electrotherapy by Giovanni Aldini (1762-1834)
my home institution. I spent a few days with the neuro-interventionalist, where I observed certain procedures not practiced within our department.

I spent time at different specialty clinics, learning much from everyone involved. By week four, I attended different specialty clinics, such as the neuromuscular unit, as well as the multiple sclerosis, epilepsy, headache, vertigo and Parkinson’s disease clinics. Each unit was a stimulating experience. At the vertigo clinic, for the first time, I could see electro-oculography being performed on a patient. During a night shift, I learned how to evaluate and confirm brain death.

I was invited to give a talk on the practice of neurology in Ethiopia. I got to talk about my country, the burden of neurological disease in our setting, how neurology is being practiced, which neurological disorders are common and how we manage them. The audience was attentive, and the post-talk discussion was very lively. It allowed me to share my experiences and describe working conditions on “the other side of the world.”

I also had the privilege to visit another hospital, Kaiser Permanente Spital and attend a tumor board session, guided by Professor Wolfgang Grisold. I found it to be interesting, and it can easily be adapted to a set up like ours.

My stay in Vienna was not only formally educational, but it also gave me the opportunity to meet neurologists from Austria and share experiences.

My weekends were always full, and my stay in Vienna was not only formally educational, but the city also gave me the opportunity to meet neurologists from Austria and share experiences.

My weekends were always full, and I attended my first opera. While walking in the park of Schönbrunn during a windy day in October, I was impressed with the antiquely furnished imperial apartment, the Sissi Museum and the silver collection of the Hofburg Palace. I was also speechless to see all the paintings by pioneer expressionist painters, such as Klimt, Schiele and Kokoschka at the beautiful palace of Belvedere. I attended an Edward Munch exhibition hosted by the Albertina Museum. It was also in Vienna that I attended my first opera.

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ZIKA VIRUS
continued from page 1

reported a febrile rash illness compatible with Zika in the days or weeks before their weakness onset. In addition, clinicians in Brazil noted a 20-fold increase in microcephaly in 2015, compared to previous years, with microcephalic babies born approximately eight to nine months after the first recognition of Zika virus. Some of the infants’ mothers reported a rash illness compatible with Zika virus infection while pregnant, leading to the suspicion that the microcephaly was somehow associated with Zika virus infection.

Nearly 90 percent of the cases of microcephaly occurred in the northeastern region of the country,^4^ areas experiencing some of the heaviest burdens of Zika virus infection as well. French Polynesian health authorities reported an unusual increase in central nervous system malformations in babies born during a Zika virus outbreak on the islands from 2014 to 2015. The infection has now spread across most of South America and Mexico. To date, few cases have been reported in the United States among travelers returning from Zika virus-affected regions.\(^6\)\(^,\)\(^7\)

Virology and Pathophysicsiology

Zika virus is a positive-sense, single-stranded RNA virus (genome 10.7 K nucleotides) belonging to the flaviviridae family, which includes dengue, yellow fever, Japanese encephalitis, St. Louis encephalitis and West Nile virus. It has the ability to cross the placenta and cause developmental brain abnormalities in children, suggesting that the virus likely infects neural stem cells. The severity of brain malformations may be related to the stage of fetal development at the time of infection. Microcephaly would be the most common manifestation, but if infection were to occur in earlier stages of fetal development, anencephaly or lissencephaly may occur.

The pathophysiology of ascending paralysis and myelitis in adults is unknown. However, mice injected with the virus can develop paralysis, suggesting direct invasion by the virus, although an immune-mediated, post-viral syndrome is also possible. It remains unknown if once infected and recovered if an individual develops long-term immunity or not, and if recurrent infections or relapses can occur. Questions regarding long-term viral persistence in tissue reservoirs also remain unanswered.
Zika Virus

Transmission

The virus is transmitted by the *Aedes* species of mosquitoes, transmitted through the bite of an infected mosquito. *A. aegypti*, the vector involved with transmission of dengue, a closely related flavivirus. Additionally, experimental evidence suggests the virus can be transmitted by Asian tiger mosquitoes (*Aedes albopictus*), which can survive in cold temperatures. Most arboviruses have an intermediary host or “reservoir.” For West Nile virus, birds, particularly corvids, serve as these reservoirs. For *Venezuelan* and *Western Equine encephalitis* viruses, horses serve this role, and for Japanese encephalitis virus, it is primarily pigs. However, the transmission of Zika virus generally occurs directly between humans and mosquitoes. There is some evidence that human-to-human transmission may occur through sexual intercourse, and the virus has also been detected in saliva, so the potential for oral transmission also exists. The virus has been isolated from the amniotic fluid of pregnant women and blood and tissues of newborns, suggesting maternal-fetal transmission. So far, an intermediary host has not been identified.

Clinical manifestations

The majority of Zika virus infections do not cause symptoms. Among persons who develop symptoms, Zika virus infection is generally considered to be mild, causing fever, rash and body aches. Some may develop conjunctivitis. Symptoms usually last one week. The full spectrum of neurological complications from this viral infection remains unknown. The epidemiological association between microcephaly and the infection seems strong. In Brazil, annual reported rates of microcephaly would generally be somewhere around 150 cases per year. Following the introduction of Zika virus into French Polynesia, there is some evidence of Zika-associated Guillain-Barré syndrome cases on the island. Following the introduction of Zika virus to Brazil in December 2014, again, reports surfaced of large numbers of Guillain-Barré syndrome cases. In Brazil, few cases of Guillain-Barré syndrome had laboratory confirmation of Zika virus, but currently the primary method of differential diagnosis is through the detection of viral RNA through polymerase chain reaction. In Guillain-Barré syndrome, by the time the clinical features of limb weakness develop, it is unlikely that there would still be circulating virus, and, as such, detection of viral RNA would not be expected. Less commonly, some patients have been thought to have a myelitis or polio-like manifestations. Currently, it is unclear if these are all related or if indeed both spinal cord and peripheral nerves can be involved. Thus, in Brazil, epidemiologic evidence and the close temporospatial clustering of both Guillain-Barré syndrome and Zika virus cases provides intriguing circumstantial evidence for an association.

In other cases in which the virus was newly introduced, reported increases of Guillain-Barré syndrome cases have invariably appeared, including in Colombia, Venezuela and, more recently, El Salvador, which reported 46 Guillain-Barré syndrome cases in a 4-week period from December 2015 to early January 2016. That is nearly three times more than the country would normally see in that timeframe. Laboratory substantiation of an association between Zika virus and Guillain-Barré syndrome has proved challenging, however. By noted, as the time of onset of weakness, the virus would be expected to be cleared from the body, and molecular techniques to identify the virus or viral RNA would not be expected to be positive. Detection of Zika virus-specific antibodies would provide evidence of current or prior infection. However, that method also has its challenges. Dengue virus is a closely related flavivirus to Zika, and it has not been shown that the two viruses are always associated with Zika virus. However, dengue virus infection has also been rarely associated with Guillain-Barré syndrome, and laboratory testing by serology is challenging due to the substantial cross-reactivity of antibodies between Zika virus and dengue virus. Since Zika and dengue viruses are spread by the same mosquito vector and co-circulate at the same time of the year, it can be challenging to differentiate between infection with the two viruses. Development of a robust serologic assay that can reliably differentiate Zika virus from dengue and other closely related flaviviruses will be crucial in order to provide laboratory evidence of Zika-associated Guillain-Barré syndrome, as well as other late complications of Zika virus. Currently, the nature of the neuropathy is not known, as results of electrodiagnostics to determine the clinical sub-type of Guillain-Barre syndrome possibly associated with Zika virus has been rarely reported. It would be important to know if it is axonal or demyelinating and if it is immune mediated. This could affect treatment and prognosis. Recovery from demyelinating neuropathies is generally better than those due to axonal injury. Isolated reports suggest that the neuropathy may be demyelinating and may respond to treatment with intravenous immunoglobulin.

Laboratory Diagnosis

Viremia occurs only during the first few days of the illness, but if blood samples are obtained during that time, virus can be detected by polymerase chain reaction. Following this phase, IgM antibodies can be demonstrated by ELISA or Western blot analysis. Previous epidemics have noted that there is cross reactivity between antibodies to Zika and other arboviruses such as dengue. The Centers for Disease Control and Prevention (CDC) has issued guidelines for the testing of infants born with possible Zika virus infection.

Treatment and Prevention

Currently, there is no effective treatment or vaccine against the virus. Hence, prevention is key with control of mosquito populations and prevention of mosquito bites. Travel advisories have been issued for pregnant women not to travel to areas with recent Zika virus outbreaks. For individuals who suffer from the neurological consequences of the infection, long-term supportive and symptomatic treatment is key. The socio-economic impact of the infection, particularly if the association between Zika virus and microcephaly holds true, will likely be huge and felt for decades. While the large number of cases of microcephaly is tragic, whatever the eventual cause turns out to be, it will result in large numbers of children with developmental disorders and beg for the need to treat personnel in a wide variety of health disciplines, including neurology, rehabilitation, specialized nursing, social services, etc., to care for and treat this population. Ongoing surveillance for Zika virus in the Americas and elsewhere, to monitor its continued spread, as well as documentation of infection among travelers returning from affected areas will be critical. Development of more robust serologic assays that can differentiate Zika virus from other closely related flaviviruses will be important to help substantiate an association between Zika virus and devastating neurologic conditions, such as Guillain-Barre syndrome and microcephaly. Ultimately, the long-term epidemiologic pattern of Zika virus will be important to monitor.

References:


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Neurology International Residents Videoconference and Exchange (NIRVE) Connects Neurology Residents Around the World

T he 2013 WFN neurology training survey highlighted great variability in neurology training programs across the world.1 Neurology trainees are interested in international clinical experiences, but are often constrained by limited flexible time as well as financial, educational or logistical support.2 With the advent of modern technology, 95 percent of current international neurology trainees have reliable Internet access.1 Video-conferenced medical rounds are a new and proven way to supplement medical education across distances and may represent a sustainable solution to global peer learning.3,4

The Neurology International Residents Videoconference and Exchange (NIRVE) is a resident initiative sponsored by the Peter A. Silverman Global e-Health Program, the Canada International Scientific Exchange Program (CISEPO) and the Baycrest Center for Geriatric Care in Toronto. In 2009, Dr. Dalia Rotstein, a former neurology resident and now faculty member at the University of Toronto, established NIRVE with the vision to connect neurology residents across various geographical sites. NIRVE was modeled on the International Behavioral Neurology Videoconference Rounds.5

NIRVE was designed to develop leadership skills and create opportunities for residents at all levels to participate in medical education and peer learning, raise awareness of global health concepts in neurology, increase resident advocacy of global health issues, enhance international and national collaboration among neurology residents and act as a gateway for organizing on-site exchanges. The participating international sites on a rotating basis host the rounds every first Thursday morning of the month.

Residents from the host site present a neurology case through videoconferencing technologies, and neurology resident moderators encourage the audience to actively engage in discussions and exchange opinions in real time.

Since its inception, NIRVE has continued to grow and expand. Neurology residents, fellows and faculty from Toronto with international contacts or affiliations initially recruited partner sites. For example, Olga Finlayson, a former University of Toronto neurology resident, helped establish a lasting collaboration and later clinical exchange with the First State Pavlov University in St. Petersburg, Russia. Our current partner sites include Natal, Brazil; São Paulo, Brazil; Grenoble, France; Jos, Nigeria; and Ufa, Russia. Participation is free and any site in the world with videoconferencing technology is welcome to join NIRVE as an equal partner.

Methods

The rounds start at 8 a.m. Eastern time, with a 30-minute case presentation and a 15-minute ‘image challenge’ focused on a radiological or pathological diagnosis, with accompanying neuro-images. The rounds include sufficient time to engage residents in discussions involving diagnostic steps and therapeutic management across the different international sites. The current video-conferencing equipment (H.323/SIP connection protocol) is free within Ontario. International sites connect through a video conference MCU or bridge (Resolve Collaboration) at an hourly rate of slightly more than $35 per site (sponsored by the Peter A. Silverman Global e-Health Program, CISEPO and Baycrest Center for Geriatric Care).1 As of 2015, webcasting with password protection has been implemented using the Ontario Telemedicine Network, allowing any resident with Internet to connect to our rounds.4

As a resident-led initiative, NIRVE values all input from its participants and actively seeks feedback to further improve the program and curriculum to cater to participant needs. In 2015, a formal survey was distributed to all NIRVE participants and site directors from 2014-2015. The questionnaire consisted of four parts: demographic information, questions on the main case presentation, questions on the image challenge and exchange participation. The survey assessed both qualitative and quantitative responses from the participants and was administered using Survey Monkey9.

Results

More than 100 trainees from 10 different sites have attended NIRVE rounds since its inception. Figure 1 shows the categories and number of presentations in each category that have been covered at the NIRVE rounds, with neurovascular and neuroinfectious diseases being the two most common.

Twenty-seven, or 60 percent, of the 45 trainees across four different sites participated in the survey. The average age of these trainees between the ages of 24 to 53 was 29.4 years, and 16, or 60 percent of trainees, were females. While most were neurology residents at different levels of training, two sub-specialty fellows, one postdoctoral fellow and two PhD students also participated in the survey. Slightly more than 60 percent of trainees identified languages other than English as the language of instruction in their medical training. Of the 25 residents surveyed, 91.6 percent thought that the rounds were relevant to their level of training, 95.8 percent identified that the rounds contributed to their existing knowledge and 87.5 percent agreed that the topics align with their academic interests (Table 1). Seventy-two percent of trainees were interested in presenting at the rounds in the future, and 80 percent indicated an interest in participating in a future clinical exchange program. Most trainees identified the case discussions as the most beneficial aspect of the rounds and suggestions were made to increase emphasis on global health topics and comparing and contrasting practices across the world.

Discussion

There are considerable variations in the occurrence and management of neurological conditions across the world. As neurology trainees prepare for their future careers in an increasingly globalized world, providing early exposure to a variety of cases and management strategies can be challenging. NIRVE provides an opportunity to fill this gap while fostering a platform for potential collaborations.

Over the past years, NIRVE has encountered considerable challenges limiting its expansion. The difference in time zones across countries, various costs associated with room rental and equipment purchase for some international sites, and English as the main language for the rounds have limited the number of trainees we have been able to engage. Looking to the future, creating a bigger role for webcasting, and password protected archived webcasts could be a more cost-effective strategy to expand our reach. However, increased connectivity may come at the price of reduced real-time interaction. Finally, an

Table 1. Results for educational value of NIRVE rounds in 2015 (N = 25)

<table>
<thead>
<tr>
<th>Questions</th>
<th>% Yes Main case</th>
<th>% Yes Imaging challenge</th>
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<tbody>
<tr>
<td>Were these rounds relevant to your level of training?</td>
<td>91.6%</td>
<td>88.0%</td>
</tr>
<tr>
<td>Do these rounds add to your existing knowledge?</td>
<td>95.8%</td>
<td>96.0%</td>
</tr>
<tr>
<td>Do these rounds align with your interests?</td>
<td>87.5%</td>
<td>96.0%</td>
</tr>
</tbody>
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Conclusion

Despite challenges including technological, logistical and language-related constraints, NIRVE rounds continue to supplement resident learning across different geographical, political and cultural backgrounds. We welcome residents and fellows from other programs to contact us at nirve.utoronto@gmail.com for more information about NIRVE or to participate in NIRVE. We are happy to provide further information on some technical requirements and further details. •

References

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Neurological Board

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Successful candidates of the 7th EBN Exam in Berlin June 19, 2015 displaying their certificates

So, today, we can’t restrict ourselves to information known by heart. We should be able to combine it with recent facts and developments. The ability to handle knowledge will become more and more important. This is the reason we offer our candidates the opportunity to take their own favorite textbooks (and in the future, electronic devices) to the examination to solve higher-order, open-book questions derived from real life, as they do in real life. Beside the great textbooks, guidelines and electronic courses from the EAN are the basis for the questions provided.

This isn’t all. Further competencies important for being a good specialist are described in several systems, such as in the CanMEDS roles (www.royalcollege.ca). In this system, a neurologist should not just be a medical expert, and the EBN exam should not be confined to testing neurological knowledge. Testing abilities in other CanMEDS roles like communicator, health advocate, professional and scholar comprise another and more essential part of the EBN examination.

How should we test these abilities within the other competencies? Does this need just another couple of multiple choice questions? We feel that this cannot be achieved by written computer examinations. For example, public health or global health issues (being a health advocate) have their national emphases, and ethical points of view vary in different countries. Thus, there is no absolute truth to be tested. A face-to-face discussion is more suitable than making a choice in the closed format of a multiple-choice question for testing a sufficient number of adequate participants.

We are happy to see the number of participants grow each year. The exam becomes attractive to more candidates from inside, but also from outside Europe — many of whom want to take the exam to increase the possibility of moving between European countries or to test their abilities on a European level. In this respect, Turkey, Belgium and Italy now take a leading role by sponsoring their young neurologists to take the EBN exam, in addition to their national exit exams.

Unfortunately, by now, board exams do not yet have a legal value in Europe, and this restrains many young neurologists from taking the examination. With increasing interest in Europe and the cooperation between European countries, we are likely to establish a goal of a European exam to be taken as an exit test in order to work as a neurologist in the European continent in the near future. Striving for such a pretentious goal forces us to look at the American board exams for neurology to try to reach their high quality level, while keeping the European flavor in our own tests.

More information about the EBN Examination can be found on our website: www.uems-neuroboard.org. We would be delighted to welcome you there. •
neurology. Most of the trained neurologists get their training abroad. Many leave their countries because there are no posts for neurologists in the university or the ministry of health. The number of trained neurologists in many countries can be counted on two hands. For instance, only 11 countries in Africa have more than 10 neurologists per country, five countries in Africa have only five to 10 neurologists per country, and 25 countries in Africa have one to four neurologists per country.

In countries with good neurology training programs, well-established neurology services can only be found in central cities, and patients have to travel for hundreds of miles to find a good neurology service.

We Had a Plan

The Treat and Teach Initiative

For the aforementioned reasons, Ain Shams University has been endorsing an initiative called Treat and Teach, which is designed to develop short- and intermediate-term strategies to reduce the gap in the number of trained neurologists and the deficiency of neurology education programs in Africa. We are trying to complement the current efforts to improve neurology education in Africa with an initiative that has a mix of online education and on-site clinical training, while working on establishing medical services that may include a stroke unit, memory clinic, neurorehabilitation units, or a neurology department. Master degrees will be given from Ain Shams University, Cairo, and work will be done to establish local master degrees in rural centers. This could lead to national neuroscience services run by local providers.

The Conference

To promote this initiative, Ain Shams University organized the First Arab African Telenurology Conference: A Treat and Teach Initiative. Held in the League of Arab States January 19–20, 2016, the conference was designed for medical and non-medical stakeholders. Representatives of Ain Shams University, the League of Arab States, Egyptian ministries of health, foreign affairs and communications, Egyptian military hospitals, the American Telemedicine Association and WHO joined the discussions, in addition to 247 attendees representing 12 countries and 13 universities.

Discussions Focused On

1. The high prevalence of neurologic disorders, their impact on the community in terms of mortality and morbidity, and the importance of time-to-start management and clinical expertise to manage these sophisticated cases.
2. The clear deficiency in trained neurologists in rural parts of Arab countries and in most African countries.
3. The increasing numbers of trained neurologists and specialized neurology services in large cities, such as Cairo, the challenge to use these experiences in rural areas and avoid the brain drain problem, and the importance of establishing stronger inter-African communications to bridge geographical barriers.
4. Presentations from international experts in the field illustrating experiences from the Mayo Clinic, Harvard, California and the U.K.; experiences from Egypt and Sudan were also presented.
5. The great potential and readiness for change in many sub-Saharan countries. Africa is a young continent, with an average age of 17 to 20 years old. Africa will have the largest workforce in the world in the next 25 years, and seven out of 10 of the fastest growing economies in the world are sub-Saharan African countries. Government spending on health care worldwide is the highest in Africa (18.4 percent). The number of Internet users in Africa multiplied 70 times from 2000 to 2010.
6. As a proof of concept, four speakers invited from the U.S. used telecommunication technologies to give live interactive sessions showing scientific information and giving second opinions about selected cases.

A round table discussion worked on the action plan of launching the Treat and Teach Initiative. There were six objectives for this round table discussion:

1. Governance and planning
2. Human resources
3. Technology
4. Sustainability
5. Regulations
6. Research

Results and Recommendations of the Meeting

1. Ain Shams University has agreed to start the first telenurology unit in Egypt. Ain Shams has signed several agreements with Egyptian hospitals and African universities to start a proof of concept phase of hospital-to-hospital acute care telenurology service that would be complemented with bilateral mobility to facilitate service development in remote areas. Similar agreements with other Arab States January 19–20, 2016, the conference was designed for medical and non-medical stakeholders. Representatives of Ain Shams University, the League of Arab States, Egyptian ministries of health, foreign affairs and communications, Egyptian military hospitals, the American Telemedicine Association and WHO joined the discussions, in addition to 247 attendees representing 12 countries and 13 universities.

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national centers of excellence are also underway.

2. Additionally, Ain Shams University, WHO, Egyptian ministries of health and foreign affairs, military forces, and the Arab League are currently collaborating to establish an Arab African center of excellence for neurology, neurosurgery and telenurology, which would serve as a regional center of excellence to support best medical practices and education.

The management of this center should provide a self-sustained investment model that would facilitate public-private partnerships. Ain Shams University is currently preparing an initial proposal for this project. A copy of this project will be delivered to the Egyptian government and another copy to the meeting of Arab Ministers of Health meeting.

Conclusions: The Happy End

1. It is of utmost importance to nurture local neurology leaders by giving them the right mix of scientific and management skills, in addition to logistically supporting their starting neurology programs.

2. Although we think highly of new telecommunication technologies as a way to bypass geographical barriers, we are aware of its limitations. Neurology, as all other medical specialties, requires direct face-to-face interactions with mentors and patients alike, thus the essential role of bilateral mobility in the Treat and Teach Initiative.

3. Sustainability is always a key issue in developing services. It is estimated that 90 percent of telemedicine projects stop after a few years. The role of education, in addition to telemedicine practice, is essential to ensure the sustainability of this project. Thinking of the spoke as a “hub in evolution” is mandatory in our view to promote the growth and progress of the best medical care to this large population of the world. The other important guarantee for sustainability is the integration of telemedicine practice in everyday work.

4. Work should be done to establish centers of excellence that are strategically located and connected to peripheral hubs in a model that allows growth, dissemination of knowledge and sustainability. This lies within a health care system that offers support to everyone in the community. The self-sustained investment model and the idea of promoting local neurology champs would ideally offer physicians working in remote areas more self-actualization values, in addition to a decent financial revenue that can help reverse the brain leak of trained clinicians.

5. The research programs of these centers should be targeted toward the actual needs of this part of the world, developing the concepts and finding new solutions for better health care delivery. The real change would be to gain the ability to produce knowledge.