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EDITORIAL

An interview with Carla Bentes, 2018 *Epilepsia Open* Prize Winner for Clinical Research

WHO ARE YOU?

I′m a Portuguese neurologist and neurophysiologist. My pre-graduate education was completed at Lisbon University Faculty of Medicine . My postgraduate clinical training, first in neurology and after in neurophysiology, has been undertaken mainly at Hospital de Santa Maria in Lisbon. I also had the opportunity to be an overseas fellow at the department of clinical neurophysiology at King's College Hospital, in London. Currently, I′m the head of the EEG/ Sleep Laboratory at the Department of Neurosciences and Mental Health, member of the Refractory Epilepsy Reference Centre at Santa Maria Hospital - North Lisbon Hospitalar Centre, and a PhD Finalist Student at Lisbon Academic Medical Centre in Lisbon.

Above all, I′m a mother of four beautiful children who enjoys classical music and ballet.

WHAT GOT YOU INTERESTED IN EPILEPSY RESEARCH?

During my first years of neurology residency I experienced a strong influence from Dr. Francisco Pinto, my internship supervisor, one of the first Portuguese epileptologists and, by that time, the President of the Portuguese Chapter of the International League Against Epilepsy. With him, I discovered the clinical challenges and caveats of epilepsy diagnosis, treatment, and outcome prediction. I also had the chance to learn the clinical usefulness of electroencephalography (EEG) with Professor Teresa Paiva and to grow up in a very productive clinical neurology research environment at the department of neurology whose Director, Professor José M. Ferro, became my PhD supervisor. My clinical interest and research curiosity for epilepsy have indeed developed together. In the clinical environment I realized that epileptic seizures and cerebrovascular disorders are two of the most frequent neurological pathologies imposing important mutual challenges. Furthermore, in the last years, stroke care has evolved remarkably, and facing a new paradigm of acute standard care (centered on multidisciplinary stroke units), I thought that epileptic seizures (as stroke complications) deserved to be rethought. Also, in everyday clinical practice, I realized that EEG is an essential neurophysiological exam in the evaluation of patients with epileptic seizures, status epilepsy, and/or epilepsy, both for diagnosis and classification, as well as for the establishment of a correct treatment or outcome prediction. However, the clinical usefulness of EEG in the differential diagnosis of transient neurological symptoms, namely in the differentiation between a transient ischemic attack and some epileptic seizures, and in the diagnosis or prediction of poststroke seizures or in poststroke prognosis prediction, remained uncertain. For these reasons, I decided that my PhD thesis would be about poststroke seizures and EEG in cerebrovascular disease.

Explain for our general readership what question your study addressed and how did you go about designing you study?

Poststroke seizures and electroencephalographic abnormalities have been associated with an unfavorable stroke functional outcome. However, this association may depend on clinical and imaging–related stroke severity, which are by themselves strong predictors of stroke outcome. Therefore, we aimed to analyze whether poststroke epileptic seizures and early EEG abnormalities are predictors of stroke outcome, after adjustment for age and clinical/imaging infarct severity

We performed a prospective longitudinal study of acute anterior circulation ischemic stroke patients, consecutively admitted to a stroke unit over 24 months and followed-up for 1 year. Patients underwent standardized clinical, diagnostic, and neurophysiological assessment. An early (≤72 h after stroke) and short duration (≤60 minutes) video-EEG protocol with an extended montage including 64 EEG channels was established.

What were the results and how do you interpret your findings?

In patients with an anterior circulation ischemic stroke, we found that acute symptomatic seizures (occurring in the first 7 days after stroke) and unprovoked seizures (occurring after the 7th day) are independent predictors of vital and functional outcome (respectively) 1 year after stroke. Therefore, our results showed that poststroke seizure recognition and prevention strategies might be clinically relevant. Furthermore, early EEG abnormalities (background activity slowing and asymmetry) were independent predictors and comparable to age and clinical/imaging infarct severity in stroke functional outcome discrimination, reflecting the concept that EEG is a sensitive and robust method in the functional assessment of the brain.

What next steps in epilepsy research are you taking and what are your career goals?

After this work, we proceed to further investigate the role of EEG in patients with acute cerebrovascular disease. The following steps are to know if early EEG could help the prediction of poststroke epilepsy and to study the role of quantitative EEG in stroke outcome prediction. Two articles already in press will explore these questions. These manuscript texts, as well as previous articles, are included in my PhD thesis, which

should be finalized this year. During this period, my primary personal goal was to develop research skills in epileptology that allowed me to continue investigation in the field and to supervise other students in the future.

The global aim of this thesis was to use the clinical model of acute ischemic cerebrovascular disease to study the value of EEG in the differential diagnosis of transient neurological symptoms,[1] in the diagnosis[2–4] and prediction of poststroke seizures and epilepsy,[5] as well as to analyze if electroencephalographic abnormalities and/or epileptic seizures are independent predictors of an anterior circulation ischemic stroke outcome, as described in this article published in *Epilepsia Open*.[6] Furthermore, because the *gold standard* of acute stroke care (namely intravenous alteplase treatment) is associated with a reduction of mortality and incapacity of treated patients with possible consequences in poststroke seizure frequency, but a proconvulsive and an epileptogenic effect of alteplase has also been described, we aim to test the hypothesis that ischemic stroke patients treated with intravenous alteplase have a different frequency of epileptic (clinic and/or electroencephalographic) manifestations compared to nontreated patients.[7] Different research methodologies were used to accomplish these goals.

Globally, all these research projects have shown the value of EEG in the current paradigm of the care of stroke patient. Furthermore, they expand the knowledge both about the role of EEG as a complementary neurophysiological tool in general neurology and about different aspects of the diagnosis and outcome of two of the most prevalent neurological disorders, cerebrovascular diseases and epilepsy. With this work, beyond the value of specific results, several other research questions about EEG and seizures in ischemic cerebrovascular disease emerge. Therefore, new possibilities of future research, ideally multicentric, clinical, or translational are emerging.

What does the *Epilepsia Open* Prize mean for you, your laboratory, research institute, and your future?

I am very honored with the clinical *Epilepsia Open* Prize. It is very rewarding to feel that our hard work is recognized and considered as a contribution to clinical epileptology. Indeed, it was our work, the work of a team, which I had the privilege to work with. Therefore, it is also our *Epilepsia Open* Prize.

I want to congratulate *Epilepsia Open* for the initiative. A very important stimulus for researchers in epilepsy,

especially in Portugal! I feel very enthusiastic because of this prize. It will allow my presence at the European Congress on Epileptology, to present my work and discuss it with my colleagues, something that would not have been possible otherwise. I hope that future collaborative projects will arise in a near future!

Read the winning article "Seizures, electroencephalographic abnormalities, and outcome of ischemic stroke patients" online at https://onlinelibrary.wiley.com/doi/10. 1002/epi4.12075.

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