SINGAPORE EPILEPSY FOUNDATION Newsletter

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Editorial

It is my pleasure to put together the second Singapore Epilepsy Foundation Newsletter of the year. In this edition we are have now reached the letters N, O, P in series on the ABC of epilepsy. Some of the topics covered include nocturnal and non-convulsive seizures to psychomotor seizures.

Since the whole of the human genome was recently gathered by scientists from all over the world, the subject of genetics has touched on many aspects of our lives. And as I am sure many of you suspect or already know, genetics do play a role in Epilepsy. There is nowadays a concerted effort to try and better define the role of genetics in Epilepsy. It is not a straight forward or easy-to-understand subject. In this issue we explore some of the genetic issues of epilepsy. For this reason this edition's "Glimpse into research" is entitled: "Epilepsy, can it be inherited?", Professor Jean-Marc Burgunder, who heads the Neurogenetics section of the National Neuroscience Institute in Singapore, discusses and updates us on the issues of genetics and epilepsy.

Please enjoy the issue and pass it on to someone who might benefit from it!

The Editor

Activities and News

SINGAPORE EPILEPSY SOCIETY

The Singapore Epilepsy Foundation and the Singapore Epilepsy Society are now working together closely and have started organizing joint meetings.

SES Committee:

President:	**A/Professor Lee Wei Ling**
Vice-President:	**Dr Puvanendran**
Secretary:	**Dr Lim Shih Hui**
Treasurer:	**Dr Ong Hian Tat**
Committee Members:	**Dr Sitoh Yih Yian**
	Dr Ng Beng Yeong
	A/Professor Einar Wilder-Smith

SEF Council Members

Epilepsy education

ABC of Epilepsy

Non-convulsive seizure

This is a descriptive term of an epileptic attack which is not accompanied by movements of the limbs or any part of the body. There may be many different causes of this type of an epileptic event. Observing the attack can hide the fact of the epileptic nature of the event since the tell tale jerking of the limbs of other body parts is lacking.

Nocturnal seizure

Nocturnal means "at night-time". So literally this term implies that seizures only occur at night time. Some types of seizures are known to be bound to night time sleep only and may have a genetic component to them.

Orthostatic hypotension

This medical expression signifies that during upright body position, blood pressure is not maintained high enough to deliver appropriate amounts of blood to the brain and loss of consciousness ensues. Orthostatic hypotension is an important differential diagnosis doctors have to consider when investigating unclear loss of consciousness. It is particularly common in young adults occuring often after long episodes of standing or rapid change of body posture.

Partial Seizure

This is in distinction to generalised seizures, where the whole of the brain experiences abnormal, sudden excessive electrical discharge which results in loss of consciousness. In partial seizures, as the word describes, only part of the brain is involved in sudden excessive electrical discharge.

Psychomotor seizure

The two parts of "psycho" and "motor" aim to describe the pyschological and motor manifestations of partial seizures which most commonly arise from the temporal lobe. The "psycho" part refers to the absent mindedness or lack of concentration occuring duirng an attack, "motor" refers to the repetitive hand, arm, leg or facial movements often observed. This term is nowadays not frequently used, as better descriptive terms have replaced it in depicting the syndrome.

Glimpse into research

Epilepsy, can it be inherited?

Prof Jean-Marc BURGUNDER, Head Neurogenetic Program, National Neuroscience Institute

Sometimes the cause of epilepsy is quite obvious. For example someone might have suffered an injury at birth, or have had a head injury or an infection some years ago, or he might be taking some drugs or alcohol, or, if he is older have suffered from a stroke or have a brain tumor. Therefore it is always very important to have a precise work up with additional investigation when found appropriate by the neurologist or the pediatrician specialised in epileptology. However, often no obvious cause of the epileptic seizures is found. The question then arises, as to what the predisposition to have epilepsy is due to gene modifications. When he described epilepsy as early as 400 BC, Hippocrates had already recognised that sometimes epileptic seizures occur in several members of the same family. Research from recent years has allowed to advance knowledge about the genetic background of epilepsy in major ways, it is therefore important to be informed about the topics. The question can be dealt with in four parts. One examines epilepsy occurring as one disease in a family, the second looks at the genes found to lead to epilepsy in animals, the third looking at other hereditary disorders in which epilepsy is also found among other symptoms. The last, and more difficult question, will be to try to understand what is known about genetic predisposition to epileptic seizures due to another cause as described above. It is important to stress, that epilepsy is not to be seen as a disease by itself, rather as a group of symptoms which are important to understand and which lead the examining doctor to a diagnosis after careful assessment of all available information.

Familial epileptic syndromes

The first gene to be found in families with epilepsy was in a type of seizures occurring only at night. This was in the year 1995. A mutation of this gene leads to a change in a receptor for an important neurotransmitter in the brain, the acetylcholine receptor. In 1998 three other genes were found, and an additional 4 ones in the last two years. They encode ion channels and other neurotransmitter receptors. In more than 15 other forms of familial epileptic syndromes the locus of the gene has been found, however, the search has not yet closed up to the gene itself. In familial temporal lobe epilepsy, for example, one locus has been found on chromosome 10. The chromosomes are numbered according to their size seen in the microscopic examination after a special preparation. Of course the newly completed sequencing of the whole genome will be of great help in deciphering the additional genes leading to epilepsy. It is also important to note that different types of epileptic seizures may sometimes occur in the same family, which complicates the genetic studies and also suggests that modifying genes may play a role.

Animal studies

Some strains of animals have disorders similar to the epileptic seizures found in human. Genetic studies have been performed in them also. So far more than a dozen of genes leading to epileptic seizures have been found, particularly in mice. It will be interesting to examine the homologues of these genes in human patients with epileptic syndromes. It is interesting to note that almost all genes so far recognised during studies in human patients and in animal models to lead to epilepsy are encoding proteins used for the transmission of electrical signals in the brain. Disturbance of this signal transmission is the cause of the chaotic electric activity underlying the epileptic syndromes. These changes can also be studied in cells, in which the genes with the mutation have been implanted, and from which electric records can be performed. Such study model should also help to directly test new drugs against epileptic seizures.

Some hereditary diseases with epilepsy

There are many disorders of the brain, sometimes of quite rare occurrence, with epileptic seizures being a part of more complex and numerous

symptoms and signs. For example, abnormal development of the brain cortex leading to a disordered architecture of the grey matter and surrounding white matter, may lead to epileptic seizures as well as to developmental difficulties and learning abnormalities. Or disorders of the metabolism may lead to generalised symptoms in addition to epileptic seizures. These syndromes are usually diagnosed after recognition of all the individual symptoms present in one patient and in his family.

Genetic predisposition to epilepsy

Even when a strong cause for epilepsy is present, like a tumor or a stroke, not all patients develop epileptic seizures. It is known, for example, that stroke patients with a relative with epilepsy are more prone to have seizures. One approach to find out which genes give a predisposition to the development of seizures will be to study large populations of patients with epilepsy and to examine gene markers in the whole genome using knowledge of the whole genome and new technologies of molecular biology and computerised information science.

Conclusion

It is important that the neurologist asks details about the family history of patients with epileptic seizures. He should not only ask about the presence of epilepsy in other members of the family, but also about single seizures, or febrile seizures in childhood, since both might give clues about the causation of the seizures in a particular patient. Furthermore, he should also make enquiries about the presence of other neurological symptoms in the family, since they may provide clues to the diagnosis of an inherited disorder, of which epileptic seizures are a part. Fortunately, we are departing from the older ways in which having epileptic seizures, or having a relative with such, was considered a shame. Because of this attitude, people would not speak about it and not search help for the disorder, but now it is possible to openly discuss the matters with the professionals who can help. Hopefully the discovery of genetic background in epilepsy will also contribute to ameliorate the means of seizure treatments we have, and even to help in the prevention of seizures in people who have a particular predisposition to develop them.

First Aid of Seizures

At every SEF meeting we still hear the same sad stories about inappropriate treatment of seizures by the general public. The most common and most dangerous misperception of the general public is that during a seizure something sould be inserted into the mouth. THIS IS A HORRIBLE MISTAKE and can cause severe injuries to the person suffering the seizure as well as to the person wrongly inserting the object. We now recommend that each person suffering from seizures should tell friends and relatives **Not** to insert anything into the mouth but to follow the below recommendations:

If you happen to witness a generalised convulsive seizures the most important thing is to make sure the person does not harm him/herself during or after the seizure.

1) Lie the person on his side in the recovery position.
2) Keep the airways free. Remove loosely fitting dentures and solid objects that may have been vomited up during the seizures.
3) DO NOT insert a spoon or any other object into the mouth as this will result in two things: Injury to the mouth and teeth of the person and potential injury to you! (the person will often bite as a reflex action and fingers may be severely damaged or even lost!!)
4) Do not restrain the convulsive movements as you may injure the person.
5) Call for medical help.
6) Time the duration of the seizure.