Aïn - Shams University
Faculty of Medicine

Assessment of Growth and some Trace Elements in Patients with Intractable Epilepsy

قياس العناصر الصغرى فى الدم فى الأطفال المصابين بمرض الصرع والقياسات الانثروبومترية

Thesis
Submitted for partial fulfillment of master degree in Pediatrics

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Shereen Adel lasheen

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List of Abbreviations

Abbreviation	***Scientific terminology***
W/L	*The ratio of weight over length*
W/L^P	*The ratio of weight over a power of length*
W/L^2	*The weight/length^2 ratio*
SD	*The standard deviation*
SE	*standard error*
BMI	*Body Mass Index*
PTZ	*pentylentetrazole*
NMDA	*n-methyl-D- aspartate*
PWE	*People With Epilepsy*
ILAE	*International League Against Epilepsy*
GABA	*Gamma AMINO Butyric Acid*
GAD	*Glutamic Acid Decarboxylase*

List of Abbreviations Continue

Abbreviation	*Scientific terminology*
CNS	*Central Nervous System*
TLE	*Temporal Lobe Epilepsy*
EEG	*Electroencephalography*
IGE	*Idiopathic Generalized Epilepsy*
AEDs	*Antiepileptic Drugs*
CT	*Computerized Tomography*
MRI	*Magnetic Resonance Imaging*
MRS	*Magnetic Resonance Spectroscopy*
SPECT	*Single Photon Emission Computerized Tomography*
PET	*Poistron Emission Tomography*
GTC	*Generalized Tonic –Clonic seizure*
KD	*Ketogenic Diet*
IE	*Intractable Epilepsy*

List of Abbreviations Continue

Abbreviation	***Scientific terminology***
MTLE	*Mesial Temporal lobe Epilepsy*
VNS	*Vagus Nerve Stimulation*
FDA	*Food and Drugs Administration*
SMRs	*Standardized Mortality Ratios*
SOD	*Superoxide Dismutase*
CRIP	*Cystein-Rich Intestinal Protein*
COMA	*Committee on Medical Aspects of Food Policy*
FNB	*Food and Nutrition Board*

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Introduction

Intractable epilepsy (IE) is a condition in which seizures do not respond to first and second-line anticonvulsant drug therapy. Despite the use of new antiepileptic drugs, refractory epilepsy occurs in approximately 20–30% of patients with epilepsy ***(Mayer et al., 2002).***Though epilepsy itself does not cause neurological deterioration, the evolution of intractable epilepsy does, since patients are submitted to multiple drug treatments which lead to neurological deterioration in children affected by IE ***(Rodriguez-Barrionuevo et al., 1998).***

Children affected by refractory epilepsy could be at risk of malnutrition because of feeding difficulties (anorexia, chewing, swallowing difficulties or vomiting) ***(Bertoli, 2006).*** Frequent seizures in a child can result in poor nutritional and growth status because the child spends more of his or her day post-ictal or in an encephalopathic stupor with a resulting poor appetite or be unable to eat sufficient quantities ***(Bergqvist et al., 2008).***

Most of the commonly used anticonvulsants influence nutritional status. In particular, some drugs affect the regulation of energy balance and appetite with consequent loss (topiramate) or gain (carbamazepina, valproate) of body weight ***(Richard et al., 2000).*** AEDs can also alter the homeostasis of trace elements, electrolytes, and seriously increase membrane lipid peroxidation at the expense of protective antioxidants, leading to an increase in seizure recurrence and an idiosyncratic drug effect ***(Sherifa and Moustafa, 2004).***

Adequate trace elements and antioxidants supply is important for brain functions and prevention of neurological diseases and further elucidation of the pathological actions of such substances in the brain should result in few therapeutic approaches. Trace elements and antioxidant might have neuroprotective biological targeted benefits when used in epileptic patients ***(Sherifa and Moustafa, 2004).*** Copper and zinc are known to produce seizures in animals at low dosage, this being possibly related to the inhibition of Na-Katpasc activity, blood Manganese levels of individuals with epilepsy of unknown origin was found to be lower in manganese than those of individuals whose epilepsy was induced by trauma (e.g., head injury) or disease, suggesting a possible genetic relationship between epilepsy and abnormal manganese metabolism ***(Lucille s. et al., 1990).***

Theoretically, trace metals may have a role to play in the production of seizures and their control in humans. ***(Barbeau and Donaldson, 1974).*** Selenium is an antioxidant trace element, having the ability to promote neuronal cell survival and has a protective role against oxidative damage ***(Ashrafi et al., 2007).***

Aim of the Work

This study aims to assess growth pattern by assessing anthropometric measures in patients with idiopathic intractable epilepsy, as well as studying serum levels of some trace elements as copper, zinc, manganese and selenium and correlating them to the duration, severity, type of antiepileptic drug used and electroencephalographic changes.

Epilepsy

Definition

The earliest description of tonic clonic appear in Egyptian hieroglyphics prior to 700 B.C. ***(Fisch, 1996).***

Epilepsy was described by Hippocrates as a disease of the brain ***(Tempkin, 1971). Al –Razi*** was the first to use the term ***EL-SARR'E*** in his famous book ***EL-HAWI*** and the term epilepsy could be considered as the Latin version of the former term ***(Mahdi, 1984).***

A seizure can be defined as a sudden, transient disturbance of the brain function manifested by involuntary motor, sensory, autonomic or psychic phenomena, alone or in combination, often accompanied by alteration or loss in consciousness ***(Moe and Benke, 2005).***

The International League Aagainst Epilepsy (ILAE) defined epilepsy excessive or synchronous neuronal activity in the brain.

"Epilepsy is a disorder of the brain characterized by an enduring predisposition to generate epileptic seizures and by the neurobiologic, cognitive, psychological, and social consequences of this condition."

The definition of epilepsy requires the occurrence of at least one epileptic seizure ***(Fisher et al. 2005).***