

# Protocol for research on obstructive sleep apnea syndrome (OSAS) among epilepsy patients in University Science Malaysia Hospital

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## Abstract

Sleep dysfunction and sleep disorders are among the most common and the most underdiagnosed conditions in all of medicine, contributing to significant impairment in countless individuals, sometimes on a daily basis. Sleep-related dysfunction is particularly common in many types of neurologic dysfunction, including movement disorders such as Parkinson's disease, degenerative disorders such as Alzheimer's disease, and stroke. Perhaps no area, however, involves the number and diversity of interactions as exist between sleep and epilepsy.<sup>1</sup> Sleep disorders are common in the general population, so it is not surprising that they are also common in epilepsy patients.

When patients with epilepsy were compared with control patients using the Epworth Sleepiness Scale, epilepsy patients were drowsier. A difference was not seen, however, when a sleep apnea scale was included, emphasizing the importance of this condition. The study demonstrates that excessive daytime sleepiness is common in both epilepsy subjects and control subjects, and that much of this may be due to treatable conditions (particularly sleep apnea).<sup>2</sup>

Obstructive sleep apnea syndrome (OSAS) is a disorder of abnormal respiration during sleep that results in a combination of hypoxemia and hypercapnia. The syndrome can be caused by obstruction of the upper airway during sleep, by abnormality in regulation of breathing by the central nervous system, or by a combination of obstructive and central problems.<sup>3</sup>

The apneic episodes lead to hypoxemia and to chronic sleep deprivation because multiple arousals during the apneic episodes cause sleep fragmentation. Sleep deprivation and hypoxia can decrease the seizure threshold in epilepsy

patients. In many epilepsy patients without sleep apnea, seizures may occur on arousal.<sup>4</sup>

Under the University Science Malaysia research university grant (RU Grant) epilepsy study project, we have developed a research protocol to study the prevalence of obstructive sleep apnea syndrome in epilepsy patients. The research protocol has been approved by the University Science Malaysia Research Ethics Committee (Human) Health Campus. All epilepsy patients, both male and female who attended the neurology clinic in University Science Malaysia Hospital (HUSM) and who agree to participate in this study will be included.

This protocol involved the assessment of sleepiness in epilepsy patients by using the Berlin and Epworth questionnaires. The second step is the careful and meticulous examination of patients by otorhinolaryngologists to identify any obvious obstructive cause from the nose down to the upper airway. The possible causes are long, bulky uvula, large hypertrophied palatal tonsils, large tongue and narrow pharynx, nasal septal deviation, nasal polyps, or collapse of the nasal valve on inspiration. Less common are a retrognathic mandible, vocal cord disorders, laryngeal or tracheal abnormalities. All of the subjects will then undergo an overnight polysomnography test in HUSM sleep laboratory.

The obstructive apnea is defined as absence of airflow detected by the end tidal nasal cannula with presence of chest wall movement. The number and duration of obstructive apneas of any length will be quantified. The apnea index (AI) is defined as the number of obstructive apneas of any length per hour of sleep, is calculated for each

subject. Central apnea is defined as the absence of airflow detection with absence of chest wall movement. Mixed apnea is defined as apneas having both central and obstructive component. The lowest and highest oxygen saturation (SaO<sub>2</sub>) and the number of desaturation of more than four percent will be quantified. The total sleep time for each subject will also be quantified. The OSAS will be divided into mild, moderate and severe. Mild OSAS is defined as AI more than 1 but less than 15, moderate OSAS AI between 15 to 30 and severe OSAS when AI more than 30. Patients diagnosed as OSAS will be treated accordingly and the outcome measurement study will be carried out. By having this research protocol, it is our hope that both epilepsy and previously undiagnosed OSAS will be treated properly and accordingly.

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