Osteoporosis and Obesity in Epilepsy Patients

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Background

Epilepsy is one of the most common neurological disorders in the United States, with 3 million people affected, and estimates of 65 million worldwide [1]. This condition is taking a big toll on these patients, since it is reported that an adult patient with epilepsy has two weeks of poor mental and physical health limitation per month [2]. Therefore, improving their overall health status could result in fewer burdens on both healthcare and the patient.

Previously, participation in physical activity in this patient population was discouraged as a precaution against inducing seizures, as well as occurrence of injury to individuals stemming from the seizure [3]. However, there is evidence that exercise has a beneficial effect on seizure frequency and therefore on overall health. Indeed, one study has shown regular aerobic dancing, stretching and strength training for 60 minutes, twice a week, to be effective in reducing self-reported seizures, subjective health complaints, plasma cholesterol ratio and increased maximum O2 uptake in a group of female epilepsy patients [4]. It should be noted that while this exercise effect was not maintained during the follow-up of the study, it is most likely that the 15 week interval was not adequate enough to make a lifestyle change in this population, who did not feel confident to continue the program in individual settings. Therefore, offering increasing the opportunity for group exercise and encouraging engagement in group exercise for epilepsy patients is crucial for observing long-term measurable effects of physical activity in his population.

One other known complication (in addition to injuries) that is associated with epilepsy is fracture, however data suggest that the higher fracture rate is independent of specific seizure events [5]. One of the reasons behind the high fracture incidence rate in this population is thought to be that patients with epilepsy may be at greater risk for osteoporosis than the general population because of the propensity for these patients to lead a more sedentary lifestyle thus limiting exposure to the Vitamin D-rich sun, critical for optimal bone development [6,7]. On the other hand, it has been suggested that long-term exposure to Anti-Epileptic Drugs (AED) may contribute to osteoporosis and osteomalacia, though the mechanisms by which these disorders are exacerbated by AEDs, including dosage effects, is not at present clear [8]. One theory suggests that AEDs can interfere with the absorption of Calcium and Vitamin D, resulting in a loss of bone density, which predisposes to fracture and adversely affects quality of life, especially in the elderly [9]. Investigators in the Women’s Health Initiative study found that the use of AEDs was positively associated with total fractures, all site-specific fractures, and falls after adjusting for age, race/ethnicity and Body Mass Index (BMI) [10]. However, in the same study the authors reported no association between AED use and bone mineral density (BMD) [10]. These findings, however, were interpreted in the context of limited sample size, as well as the fact that the subset of patients who underwent BMD assessment was slightly older, and had a larger percentage of minority women than the whole cohort [10].

Furthermore, a sedentary lifestyle might have an effect also on the nutritional status of patients with epilepsy. While the general attitude of patients with epilepsy toward sports is positive, their condition may inhibit patients to get involved in any form of physical activity for fear injury [11,12]. To date, the prevalence of obesity in patients with epilepsy has only been evaluated in adults, the rate of which does not appear to differ significantly from that of general population [13]. Further, patients with epilepsy may be treated by medications such as valproate, gabapentine, carbamazepine and pregabalin that can also result weight gain [14]. Moreover, epilepsy could potentially affect hypothalamic neuroendocrine control of energy homeostasis. Thus, owing to social, neuroendocrine, and pharmacological reasons, the rates of lower bone density and prevalence of overweight/obesity may be higher in pediatric patients with epilepsy than in the general population. Physicians should consider preventative measures and treatments for these patients to try to decrease the incidence of osteoporosis and obesity at young age, which potentially can lead to more comorbidity later in adulthood.

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