

Analysis of Heart Influence in SUDEP (Sudden and Unexpected Death in Epilepsy) and Possible Preventive Measures

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Abstract

Epilepsy is a temporary and reversible change in the functioning of the brain, for several causes. Sudden, unexpected death is the most common death condition related to patients with chronic epilepsy. Thus, the present review work aims to raise awareness about the possible mechanisms of SUDEP and the possible preventive measures already studied and the approach that is a consensus among the main authors. For this, a literary review was made on the topic on several digital platforms such as Scielo, Scholar Google and PubMed. It was concluded that cardiac alterations seem to be, in fact, the cause of sudden death in epileptic patients, due to alterations caused by the state of chronic epilepsy associated with some risk factors. Thus, the first line of defense would be to control seizures, together with reducing the level of stress and performing physical activities and changing nutrition. Monitoring and knowledge of the family of basic CPR techniques and the use of defibrillators proved to be a positive alternative.

Keywords: *Epilepsy; Sudden Death; SUDEP; Arrhythmias*

Introduction

According to the Brazilian society of epilepsy, the disease is a temporary and reversible change in the functioning of the brain, which was not caused by fever, drugs or metabolic disorders. For a few seconds or minutes, a part of the brain emits incorrect signals, which may be restricted to that location or spread. If they are restricted, the crisis will be called partial; engage the two cerebral hemispheres, widespread. Therefore, some people may have more or less obvious symptoms of epilepsy, which does not mean that the problem is less important if the crisis is less apparent. Epilepsy is a relatively frequent disease, since it affects 1 to 2 people in a group of 10 individuals and it is estimated that there are about 3 million people with epilepsy in Brazil alone.

Sudden and unexpected death in epilepsy (SUDEP) is the most common condition related to death in patients with drug-resistant epilepsy. The condition is responsible for several studies around the world, with numerous proposals for preventive measures in relation to its involvement and this occurs due to the difficulty in characterizing the reasons for sudden death, since there is a lack of information about the circumstances of the death and there is difficulty in performing post-mortem biopsy [1-7].

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Objective of the Study

It is intended to promote awareness of the possible mechanisms of SUDEP, highlighting the relationship of cardiac alterations as the main etiological mechanism of sudden death in these patients, as well as raising awareness of patients with epilepsy and family members about the possible preventive measures already studied. Thus, exposing consensus on the topic among the various authors of publications on SUDEP.

Methodology

A literary review was carried out with the most relevant articles on the topic on the digital platforms Scielo, Scholar Google, and PubMed, in addition to searching for information on the website: www.epilepsy.com.

Results and Discussions

Cardiac alterations seem to be, in fact, the main cause of sudden death in epileptic patients, these alterations being related to epileptic disease and corroborated by the discovered risk factors. These risk factors converge to validate cardiac pathogenesis in sudden death caused by epilepsy.

Relationships were found between SUDEP and the frequency of generalized tonic-clonic seizures, use of antiepileptic polytherapy, duration of epilepsy and age at onset (mainly young people < 16 years), gender and use of lamotrigine in therapy.

Autonomic changes have been shown to play an important role in the cardiac mechanism of SUDEP. Both sympathetic and parasympathetic activation seem to be involved in the tachyarrhythmia process, which at first appears as a bradycardia, which may be a consequence of apnea recorded during crises, followed by reflex tachycardia. Studies with rats made it possible to relate the intensity of these arrhythmias to the number of generalized seizures and the results showed that repeated epileptic episodes directly affect the sympathetic and parasympathetic influx to the heart. Thus, patients who present larger quantities of generalized tonic-clonic events throughout their lives, as well as presenting epileptic disease for a longer period of time, will be more exposed to this event.

Several studies have shown that patients with epilepsy show a higher heart rate and a longer QT interval, recorded on ECG, when compared to patients without cardiac or neurological changes at the same age. ST segment depression has also been demonstrated in 40% of patients during convulsive episodes, suggesting that cardiac ischemia could occur in these patients.

Some pathological changes could also be described in the heart of patients who died from SUDEP, they include fibrosis of the walls of small coronary arteries, atrophy of cardiomyocytes, myofibrillar degeneration, edema of the conductive tissue and morphological abnormalities of the cardiac conduction system. Antiepileptic drugs with arrhythmogenic characteristics or that transmit epileptogenic activity via the autonomic nervous system to the heart, seem to play a major role in this regard. Carbamazepine occupies a prominent place there, as it increases the sympathetic tone of the autonomic nervous system and decreases the atrial ventricular conduction, thus increasing the risk of arrhythmias. The use of antiepileptic drugs can cause inappropriate secretion of antidiuretics, triggering hyponatremia, which can be another factor related to the sudden death in epilepsy.

Conclusion

In view of the above, we understand that the first line of defense would be the control of seizures. For this reason, the use of anticonvulsant drugs should not be minimized, but it must be taken into account that the drugs mentioned can cause, according to the studies, possible cardiac alterations, acting as an additional risk factor in patients at high risk of developing SUDEP.

Together, it is important that the patient reduces the stress level to the heart pump. If there is no contraindication, physical activities should be encouraged, and the encouragement of adequate food should be encouraged.

Finally, monitoring and knowledge, by the family and caregivers, of basic CPR techniques and use of defibrillators, can be a life-saving measure, not only in the context of SUDEP, but in this case it presents itself as a very positive in preventing sudden death.

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