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Mini Review

Metabolic Disorders in Adults with Epilepsy

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Abstract

Epilepsy is a common neurological disease worldwide. Antiepileptic drugs (AEDs) often present pharmacological interactions. This presents a challenge for epilepsy treatment which becomes particularly complex in the presence of comorbidities such as metabolic disorders. The possibility of interactions between AEDs and with other drugs can alter serum concentrations of these agents and disturb several metabolic processes. Fortunately, current generations of AEDs are less susceptible to drug interactions than older ones. Classic AED use has been associated with metabolic alterations such as insulin resistance, hypercholesterolemia, osteomalacia and osteoporosis. Metabolic, infectious and inflammatory alterations underlying metabolic diseases related to seizures have been studied, however there is scarce information on these alterations in patients diagnosed with epilepsy. In México we found that a significant percentage of patients with epilepsy present some metabolic disorder such as diabetes mellitus, dyslipidemia, and hypothyroidism while overweight and obesity are the most frequent. In this context, the experience and knowledge of the physician on the overall condition of the patient will determine the selection of AEDs to prevent complications with metabolic and cardiovascular disorders that affect the quality of life.

Keywords: *Epilepsy; Seizure; Antiepileptic Drugs; Metabolic Disorders; Metabolic Syndrome*

Abbreviations

AEDs: Antiepileptic Drugs; PHB: Phenobarbital; PMD: Primidone; CBZ: Carbamazepine; PHT: Phenytoin; VPA: Valproic Acid

Introduction

Epilepsy is very common in the general population; according to the World Health Organization, in the world there are approximately 50 million people with epilepsy, with an estimated 2.4 million people newly diagnosed each year [1].

Antiepileptic drugs (AEDs) are widely used as monotherapy or as long-term adjuvant therapy in epilepsy and represent a group of drugs that are highly susceptible to drug interactions [2].

AEDs can be classified according to their action on the liver enzyme system as inducers, non-inducers and inhibitors. Classic AEDs like phenobarbital (PHB), primidone (PMD), phenytoin (PHT) and carbamazepine (CBZ) are enzyme inducing AEDs; valproic acid (VPA) is the single inhibitory AED. New generation AEDs have weak or non-inductive properties [3,4].

Therefore, besides elucidating the etiology of epilepsy and initiating pharmacological treatment, it is important to study extra-neurological systems that may be commonly affected, that is, a patient with epilepsy can have comorbidities and metabolic and/or cardiovascular disorders that may or may not be related to AEDs. Therefore, although the treatment of epilepsy alone presents great challenges, the situation is more complex for these patients with concomitant metabolic disorders. In these cases, the possibility of interactions between

AEDs and with other drugs is relevant since this can lead to alterations in serum concentrations of AEDs or other drugs, often caused by induction or inhibition of cytochrome P450 enzymes [2] and change different metabolic processes [3,5].

In this sense, new AEDs are less susceptible to pharmacokinetic drug interactions than older ones [2].

Clinical evidence

Ambulatory medical unit

Comorbidities are frequently observed in patients with epilepsy and affect it indirectly. These include not only psychiatric disorders but also systemic alterations such as liver and kidney disease, among others [5]. For this reason, AEDs should be taken only when prescribed by a physician with complete vision of both the patient and the drug's interaction mechanism, its tolerability and safety, as well as possible side effects and appropriate dose [5].

On the other hand, some alterations have been associated with AED use, for example insulin resistance, hypercholesterolemia, osteomalacia and osteoporosis, among others, particularly with classic AEDs [6,7].

The relationship between epilepsy and its therapeutic drugs is complex, with bidirectional interactions, particularly in those patients with comorbidities and polypharmacy. The evaluation and care of adult patients with epilepsy should include questions about metabolic alterations, thyroid symptoms and bone health, among others, and consider conducting additional studies as well as referring the patient to other specialists to participate in collaborative care which may be justified if underlying disorders are suspected, especially since these may pose long-term health risks and negatively affect quality of life [6,7].

In contrast, although the presence of systemic diseases associated with metabolic, infectious and inflammatory alterations that trigger epileptic seizures has been studied, few studies have evaluated these alterations in patients diagnosed with epilepsy.

The study by Scotta and colleagues estimated the prevalence of metabolic syndrome in a cohort of adult patients with epilepsy without previous major cardiovascular events; in these patients observed high rates of metabolic syndrome, obesity, hypertension, and diabetes [8].

In a brief statement in the framework of the Academic Meeting of the Mexican Chapter of the International League Against Epilepsy, we reported our descriptive, observational, retrospective and cross-sectional study carried out in the outpatient neurology consultation in 201 adult patients with epilepsy. There we found 25% of them having some metabolic disorder such as diabetes mellitus, dyslipidemia, and hypothyroidism among the most frequent and 52% were overweight or presented some degree of obesity.

Hence the challenge in the follow-up of these patients, in which the physician with a comprehensive vision, must seek to maintain adequate control of epileptic seizures and reduce metabolic and cardiovascular risk, as well as improve quality of life.

Hospitalization setting

On the other hand, patients with epilepsy who are hospitalized, particularly in intensive care units represent a special case for treatment. These patients have risk factors that include common diagnoses such as electrolyte abnormalities, hypoglycemia, infections, and drug overdose or withdrawal [9].

In this setting, several factors such as polypharmacy, unpredictable drug pharmacokinetics and the implementation of a variety of non-pharmacological interventions that can lead to drug interactions, elevated risk of toxicity, and subtherapeutic serum levels of drugs can be commonly encountered [9].

Taking these factors into account is undoubtedly a support tool in the practical and optimal management of patients with epilepsy during their hospitalization by selecting the most effective AED with the least amount of adverse events.

Conclusion

The correct diagnosis of epilepsy continues to be essential in the evaluation of the patient; However, the experience and knowledge of the physician on the general condition of the patient beyond the neurological condition will allow the selection of the AEDs according to the individual profile of the patient, thus avoiding the onset or worsening of metabolic and/or cardiovascular disorders that negatively influence the quality of life of those who suffer from them.

In patients with epilepsy and comorbidities, this can be achieved by selecting medications that are less likely to have unfavorable interactions. In those cases, in which the use of drugs with potential adverse interactions cannot be avoided, efforts should be made to minimize the clinical consequences as appropriate, making individualized dose adjustments and careful monitoring of the clinical response.

Conflict of Interest

The authors declare that no conflict of interest exists.

Bibliography

1. Lin Lin Lee., *et al.* "Treatment, Therapy and Management of Metabolic Epilepsy: A Systematic Review". *International Journal of Molecular Sciences* 19.3 (2018): 871.

2. Johannessen Svein I and Cecilie Johannessen Landmark. "Antiepileptic drug interactions - principles and clinical implications". *Current Neuropharmacology* 8.3 (2010): 254-267.

3. Renoux Christel., *et al.* "Antiepileptic drugs and the risk of ischaemic stroke and myocardial infarction: a population-based cohort study". *BMJ Open* 5.8 (2015): e008365.

4. Perucca Emilio. "Clinically relevant drug interactions with antiepileptic drugs". *British Journal of Clinical Pharmacology* 61.3 (2006): 246-255.

5. Anwar Haleema., *et al.* "Epileptic seizures". *Discoveries* 8.2 (2020): e110.

6. Pennell Page B. "Hormonal aspects of epilepsy". *Neurologic Clinics* 27.4 (2009): 941-965.

7. Valsamis Helen A., *et al.* "Antiepileptic drugs and bone metabolism". *Nutrition and Metabolism* 3.36 (2006): 6.

8. Cabral Lucas Scotta., *et al.* "Diagnostic Yield and Accuracy of Different Metabolic Syndrome Criteria in Adult Patients with Epilepsy". *Frontiers in Neurology* 8 (2017): 460.

9. Farrokh Salia., *et al.* "Antiepileptic drugs in critically ill patients". *Critical Care* 22.1 (2018): 153.

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