Commentary

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Clinical Guidelines for Epilepsy Treatment in Patients with Kidney Disorders

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Description

Additionally, it interacts with various cell surface plasminogen activator receptors of the urokinase type. uPAR is a membrane-bound glycoprotein expressed on a diverse array of cells, including activated T-lymphocytes, monocytes, macrophages, megakaryocytes, keratinocytes, fibroblasts, endothelial cells, vascular smooth muscle cells and podocytes. It comprises three homologous domains. Upon cleavage in the region between the GPI anchoring molecule and the DIII domain, the soluble form of the urokinase-type plasminogen activator receptor is released from the cell membrane. This receptor remains attached to the cell membrane *via* glycosyl-phosphatidylinositol. Elevated serum suPAR levels have been observed in patients with type 1 and type 2 diabetes, focal segmental glomerulosclerosis, chronic kidney disease, sepsis, cardiovascular diseases, cancer, autoimmune diseases, HIV infection and smoking. In patients with type 2 diabetes mellitus, it has been demonstrated that serum suPAR levels vary in direct proportion to eGFR, suggesting its potential as a biomarker for disease staging.

Clinical guidelines

Studies utilizing diffusion tensor imaging have demonstrated widespread White Matter (WM) microstructural changes in the entire brains of patients with End-Stage Renal Disease (ESRD), including the thalamus, corona radiata, amygdala and prefrontal cortex. It is believed that these changes contribute to worsening cognitive dysfunction. Neuroimaging findings have established an association between ESRD and Cognitive Impairment (CI), showing impairments in both Gray Matter (GM) and WM. However, there is a lack of research on the relationship between Mild Cognitive Impairment (MCI) and abnormal brain microstructures in ESRD patients. Glycopyrronium bromide, a synthetic anticholinergic medication used to treat Chronic Obstructive Pulmonary Disease (COPD), is primarily excreted by the kidneys. Consequently, patients with declining renal function are at increased risk of systemic exposure to this drug. To address this gap, a physiologically based pharmacokinetic model was developed using data from COPD patients with normal renal function, enabling the prediction of systemic exposure to glycopyrronium in patients with severe renal impairment. Moreover, it has been demonstrated that this approach is useful in detecting MCI biomarkers in neurodegenerative diseases. Neuroimaging evidence increasingly shows that brain structural disruption of patients with End-Stage Renal Disease (ESRD) and is correlated with cognitive decline. For example, voxel-based morphometry analysis consistently reveals a decrease in gray matter volume in ESRD patients.

Nephrotoxic effects

The purpose of to discuss the nephrotoxic effects of certain Antiepileptic Drugs (AEDs) and the use of AEDs in patients with renal impairment, including those undergoing dialysis. Levetiracetam, gabapentin, pregabalin, topiramate, eslicarbazepine, lacosamide and vigabatrin are at least partially eliminated by the kidneys. When renal clearance is reduced, the parent drug and its metabolites accumulate in the body, resulting in a longer half-life. If the dosage is not promptly adjusted, there is an increased risk of side effects. Encephalopathy caused by vigabatrin and levetiracetam are additional examples. This will examine the proportion of each drug that is metabolized, renally eliminated and protein-bound, as well as adult dosing considerations for AEDs in patients with renal disease. Dosage adjustments will be discussed in relation to the degree of renal impairment. Furthermore, the will address how fructose overindulgence can cause renal impairment linked to insulin resistance. Similarly, the use of estrogen-progestin oral contraceptive therapy has been associated with cardiometabolic syndrome and there is still no conclusive evidence regarding its non-contraceptive benefits, particularly in metabolic pathologies. Finally, inflammation and oxidative stress, characterized by excessive uric acid production, will be discussed. In this narrative review and systematic literature search, we examine the use of Antiepileptic Drugs (AEDs) in patients with renal impairment, including those undergoing dialysis. We also explore the nephrotoxic effects of certain AEDs. The primary objective of treatment is to optimize the balance between seizure control and the adverse effects of these drugs, thereby enhancing the quality of life for patients.