



Cognition and EEG Changes in Patients on Hemodialysis -Food for Thought.

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ABSTRACT:

Incidences of Chronic Kidney Disease (CKD) are increasing in a progressive manner as per literature. There are increased cognitive decline in those suffering from the same. Moreover this population is vulnerable to seizures and other neurological complications from the start of the disease as well as during progression. So Electroencephalogram (EEG) changes can be of good diagnostic and prognostic value .

I. INTRODUCTION

Chronic kidney disease (CKD) represents a significant global public health challenge due to its widespread occurrence and high prevalence rates. ^[1] Cognitive impairment is frequently observed in individuals with chronic kidney disease (CKD), especially those undergoing dialysis treatment. ^[2, 3] In high-income countries, the age-standardized prevalence of CKD is 8.6% in men and 9.6% in women. In low- and middle-income countries, the corresponding figures are 10.6% in men and 12.5% in women. ^[4] Chronic kidney disease (CKD) is defined by enduring structural or functional abnormalities in the kidneys that extend for a period exceeding three months, and these abnormalities have significant health implications. The diagnosis hinges on specific criteria, which include a reduced glomerular filtration rate (GFR) of less than 60 mL/min/1.73 m² or evidence of kidney damage such as albuminuria, tubular disorders, abnormal urine sediment, histological or imaging findings, or a history of kidney transplantation. ^[5]

Particularly, the decline in GFR and increased levels of albuminuria play pivotal roles in developing CKD complications. The disease is categorized into five stages based on GFR, and risk levels are further refined based on albuminuria levels. These CKD stages are linked to various adverse outcomes, including all-cause mortality, cardiovascular-related deaths, anemia, and bone and mineral metabolism disorders, among other

complications. ^[6] The prevalence of both chronic kidney disease (CKD) and cognitive impairment (CI) rises with advancing age. Cognitive alterations manifest in the early stages of CKD, often occurring when the glomerular filtration rate (GFR) falls below 60 mL/min/1.73 m². ^[7, 8]

II. DISCUSSION

Conflicting findings have been reported regarding the EEG alterations that occur during hemodialysis in individuals with chronic kidney disease (CKD). EEG changes induced during hemodialysis are significant, as they can provide insights into the underlying mechanisms and identify potential risk factors for neurological complications that may arise during or shortly after hemodialysis, a condition referred to as dialysis disequilibrium syndrome (DDS). ^[9, 10] Uremic encephalopathy significantly elevates the morbidity and mortality risk among individuals with chronic kidney disease (CKD). ^[11] In cases of acute kidney injury, the associated symptoms are reversible upon initiating dialysis and effectively removing toxic substances. Similarly, for individuals with end-stage renal disease (ESRD), the condition can be reversed through dialysis or kidney transplantation. Severe complications, such as seizures and coma, can unfortunately result in fatalities. Recognizing neurological symptoms early in the presence of impaired kidney function is crucial to prevent morbidity or mortality. Prompt initiation of dialytic therapy can contribute to reducing mortality rates. ^[12]

III. CONCLUSION

As CKD progresses to end-stage renal disease (ESRD), patients often require hemodialysis as a life-sustaining therapy. Beyond its well-established impact on kidney function, CKD can also affect cognitive function. Cognitive impairment in CKD patients can lead to diminished quality of life, increased morbidity, and higher healthcare costs. A detailed study aimed at



investigating the alterations in cognitive function and EEG patterns in patients with kidney disease who are newly commencing hemodialysis is the need of the hour.

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