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STUDY OF CLINICO-RADIOLOGICAL PROFILE OF SEIZURES IN PATIENTS WITH RENAL FAILURE (ACUTE KIDNEY INJURY AND CHRONIC KIDNEY DISEASE) IN A TERTIARY CARE HOSPITAL

Neurology

Dr Anuj Vilas Nehete Senior Resident Department Of Neurology J.s.s.medical College, Mysuru.

Dr Harsha S* Professor And Hod Department Of Neurology J.S.S.medical College, Mysuru. *Corresponding Author

Dr Manjunath S Shetty Professor And Hod Department Of Nephrology J.S.S. Medical College, Mysuru.

Dr Nemichandra S C Assistant Professor Department Of Neurology J.S.S. Medical College, Mysuru

Dr Shasthara P Senior Resident Department Of Neurology J.S.S. Medical College, Mysuru

Dr Siddartha Joshi Senior Resident Department Of Neurology J.S.S. Medical College, Mysuru

ABSTRACT

Seizures occurring in patients with renal failure (acute kidney injury and chronic kidney disease) are multifactorial in causation which includes uremic toxins, hypertensive complications like intracerebral bleed, neuroinfections, dialysis related complications, dyselectrolytemia, metabolic insults.This is an observational clinical study,done to analyse the spectrum of causes of seizures in patients of renal failure evaluated at our center.This study showed causes of seizures in renal failure are multiple including dyselectrolytemia, uremic encephalopathy, hypertensive encephalopathy,neuroinfections and PRES.The most common type of seizure semiology was generalized tonic clonic,followed by myoclonic and focal seizures.

KEYWORDS

INTRODUCTION:

Neurological complications are frequently seen in both Chronic kidney disease as well as Acute Kidney injury. Various reviews have documented involvment of both Peripheral and central nervous system in patients with renal disorders. The central nervous system invovlement in renal diseases can include Cognitive, Vascular , Movement and sleep disorders. It has been estimated that seizures occur in 10% of patients withchronic renal failure[1].

The cause for seizures in patients suffering from Renal disease as elucidated by various authors include Malignant hypertension, Dialysis Dysequilibrium syndorme, Intradilaitic hemodynamic instability, dyselectrolytemia (table 1), Uremia, Stroke, Posterior reversible encephelopathy (PRES), Hypoglycemia and Central Nervous System Infection.

Literature in the past has addressed the cohort of seizure patients in renal failure undergoing dialysis but studies on seizures in all sets of renal failure(AKI and CKD) patients are sparse. This study aims to look at the various factors causing seizures in a patient with renal failure(AKI and CKD) in a teritiary hospital setting.

Table 1: Electrolyte abnormality and seizures in clinicalPractice[2]

Electrolyte abnormality	Frequency in clinical practice	Frequency of seizures in acute/ severe imbalance
Hyponatremia	+++	++
Hypernatremia	++	++/+
Hypocalcemia	+	++/+
Hypercalcemia	++	+
Hypomagnesemia	++	++/+
Hypokalemia	+++	–
Hyperkalemia	++	–

+++, Frequent; ++, occasional; +, rare; –, absent.

REVIEW OF LITERATURE:

The commonly accepted operational definition of Epilepsy is the occurrence of at least two or more unprovoked seizures more than 24 hours apart. Bergen and colleagues reported an estimated incidence of seizure of approximately 10% in patients with chronic renal failure[3]. In addition Plum and Posner also noted that convulsions occurred in one third of patients with end-stage renal disease (ESRD) and was frequently a preterminal event[4]. The seizures in these series usually were generalized tonic-clonic type. The mechanism of reduced seizure threshold in renal failure is still not clear as on date. Hemodialysis-associated seizure (HAS) is a common complication of hemodialysis[5]. HAS occurs in 7% to 50% of children and adolescence with ESRD, and their seizures are usually reported as generalized tonic clonic seizures[6]. On the other hand, non-convulsive seizures appear to be rare[7,8]. Risk factors include young age, prior history of seizures, malignant hypertension, microvascular diseases, uremic encephalopathy and cardiomyopathy. Moreover, induced brain water disequilibrium, hypocalcemia, uremic toxins, the use of acetate in the dialysate, intracranial hemorrhage due to systemic heparinization, treatment with recombinant erythropoietin, , concurrent use of antibiotics a hemodynamic and metabolic defects are considered putative factors for seizures.[9,10]. The present study is proposed to explore the causes of seizures in renal failure patients attending our institution.

MATERIAL AND METHODS:

OBJECTIVES OF THE STUDY:

1. To determine the incidence of seizures in patients with renal failure.
2. To evaluate the cause of seizures in patients with renal failure (AKI and CKD) during or after dialysis.
3. To determine the contribution of renal failure(AKI and CKD) to the causation of different types of seizures.
4. To correlate and analyze the data in patients of seizures with renal failure (AKI and CKD).

Type of Study: This is an observational clinical study, on patients with renal failure (AKI and CKD) who developed seizures before or during treatment at JSS Hospital during study period.

INCLUSION CRITERIA:

All patients with renal failure (AKI and CKD) who were undergoing treatment at JSS Hospital during the study period and who developed seizures were included in the study.

Exclusion criteria:

Patients who had documented seizure disorder prior to the onset of renal failure (AKI and CKD) preexisting epilepsy were excluded.

Methods of collection

After informed consent the data wascollected and recorded in the

proforma.This included information on patient profile, detailed history, biochemical profile, ECG, EEG (wherever applicable) andradiological data.

Statistical Analysis

Descriptive correlation of the data is done with respect to the variables done in the present study.

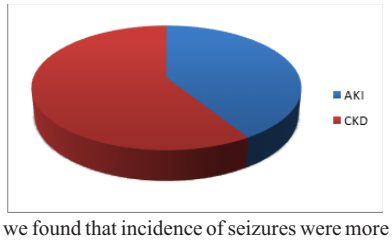
RESULTS:

Etiology

ETIOLOGY	CASES	PERCENTAGE
UREMIC ENCEPHALOPATHY	11	22%
DYSELECTROLYTEMIA	11	22%
PRES	3	6%
IC BLEED	3	6%
CVT	3	6%
HYPERTENSIVE ENCEPHALOPATHY	15	30%
INFECTIVE	3	6%

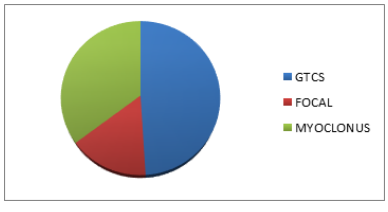
Of the Various etiologies causing seizures in patient's with renal disease in our study, Hypertensive encephalopathy was found to the most common cause and the least being neuro infections.

Type of Renal failure:



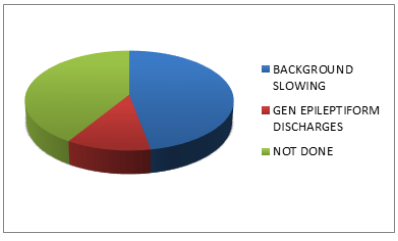
In our study we found that incidence of seizures were more common in patients with Chronic kidney disease than Acute kidney injury.

Semiology :



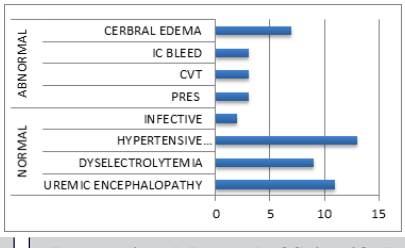
Out of the total number of cases included in our study, 49% had Generalised tonic clonic type of seizures followed by 16% of cases having Focal type of seziures with retained consiousness and the remiaing 35% presenting with myoclonic seizures.

EEG Findings:



In our study most common EEG findings among the cases was background slowing (47%), followed by generalized epileptiform discahrges (41%).

Neuro imaging findings:



Of the total number cases, abnormal neuroimaging findings were seen in sixteen cases. Most common neuroimaging finding was cerebral edema.

DISCUSSION

The pathophysiologyof uremia is probably multifactorial and associated with problems in cognition and memory which may progress to delirium, convulsions, and coma. Seizures are commonly generalised tonic clonic in type, although focal motor seizures and myoclonic seizures are also common[11]. Multi focal myoclonus characterise the later stages of the encephalopathy[11]. Causes of seizures in renal failure are multiple including dyselectrolytemia, uremicencephalopathy, hypertensive encephalopathy, neuro infectins,strokes,drug induced and dialysis disequilibrium syndrome. In this study Hypertensive encephalopathy, Uremic encephalopathy and dyselectrolytemia were the leading causes of for seizures in patients with renal failure as elucidated above. The EEG in uremia is usually shows generalized slowing, most marked frontally with an excess of delta and theta waves. Bilateral spike and wave complexes,in the absence of evident clinical seizure activity, have been reported in up to 14% of patients with chronic renal failure[12].Similar findings were noted among the subjects who underwent EEG in our study. Acute and/or severe electrolyte imbalances frequently cause seizures in renal failure,especially,sodium disorders, hypocalcemia, and hypomagnesemia. Dyselectrolytemia(Hyponatremia) was the cause of seizures in eleven cases in our study. Successful management of patient seizures begins with the establishment of an accurate diagnosis of the underlying electrolyte disturbance, because rapid identification and correction of the disturbance is necessary to control seizures and prevent permanent brain damage[13]. Neuroimaging in renal failure can give an etiological clue for seizure,depicting ischemic and hemorrhagic strokes,CVT and PRES[14]. Sixteen patients had abnormal Neuroimaging findings in our study and these included cerebral edema in seven cases, CVT, PRES and IC Bleed in three patients each.

CONCLUSION:

Patients with renal disease suffer from seizures due to multiple metabolic and structural abnormalities as demonstrated in this hospital-based study. Hence patients of renal disease developing seizures need a systematic evaluation to elucidate the underlying cause for seizures.

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