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Study of Electrolyte Disturbances in Seizure Disorders

Biochemistry

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ABSTRACT

Introduction:- This study conducted on children having seizures whose serum electrolyte levels were analyzed. Material & Methods:- Reports of children from 0 to 12 years of age were subjected to mean, standard deviation, standard error of mean and Chi square test. Results:- Test was insignificant expect for serum calcium level which was significantly reduced in infants. Conclusion:- This study suggests electrolyte imbalance is a contributory factor for occurrence of seizures except hypocalcemia in infants (0 to 1 year).

Introduction:
Seizures are paroxysmal time limited change in motor activity which may be associated with autonomic and/or behavioral abnormalities which results from abnormal electric activity in brain. No age group is free from seizures but 90 % of seizures start before 10 years of age[1]

Electrolyte imbalance such as sodium, potassium, calcium &magnesium are causes of seizures which are not adequately corrected and patient is labeled to have resistant seizures & are subjected to unnecessary neuro imaging &started on multiple anticonvulsants[2].

C Jordan Minicamp (1960) proposed electrolyte disturbances possibly as major cause of seizure[3]

Electrolyte imbalance occurs commonly with variety of neurological manifestations including central and peripheral. Electrolyte disturbance usually occurs secondary to some diseases.[4]

Material and methods :-
This study was conducted on 50 children with seizure disorder who were selected by universal sampling method & divided into two groups Group 1 which includes age from 0 to 1 year & Group 2 includes age from 1 to 12 years.

Detail history and clinical examination was done on all those children admitted with seizures

Children were also examined for signs of Rickets and dehydration. Blood samples were collected for biochemical analysis immediately after hospitalization before commencement of any specific treatment

Samples were collected for serum sodium, potassium, calcium. Other relevant investigations were also done like Blood urea nitrogen, Serum Alkaline phosphatase, C T Scan brain, Electroencephalogram (E.E.G), CSF Examination.

Statistical Analysis:
The data so collected was analyzed and was subjected to various statistical analytic tests like mean, standard deviation of mean, standard deviation from mean, chi square test, Calculations so obtained were analyzed and tabulated.

Discussion :-
By considering the sodium disturbance in our study Hyponatremia was present in 7 patients of group 1 and 8 patients of group 2 so Total 30% patients were hyponatremic. But Clinical convulsions were seen in 5 patients only.

Sodium is a chief extracellular cation found in extracellular fluid. About 50%of sodium is found in bones, 40% extracellularly &10% intracellularly. Hyponatremia is seen in cases of diarrhea, vomiting, prolonged fever, chronic renal disease & adrenocortical insufficiency (Addison s disease)[5]

But hyponatremia was not considered a major contributory factor for seizures.

In this study potassium disturbance values are analyzed & No correlation has been found between hypokalemia and seizure disorder. So hypokalemia is not found a causative factor for seizure.

Potassium disturbance can cause muscle weakness, hypotonia, paralytic ileus & characteristic ECG changes like ST segment depression, flattening of T wave etc.[6]

By studying Calcium disturbance, in our study Serum calcium was decreased in 8 patients from GROUP 1 (0 to 1 year) about 50% cases. Hypocalcemia was proved to be a major risk factor for seizures in infants.

The patients with hypocalcemia convulsions were those who Born to mothers with malnutrition, anemia & hypocalcaemia & Also seen in top fed children who inappropriately weaned.

Calcium is required for action of skeletal muscles by promoting closure of sodium channels & Preventing persistent leaking of sodium ion through membrane[7].

So in cases of hypocalcemia membrane remains persistently depolarized and throws repeated clinical convulsions.

Conclusion:
The study conducted on 50 children of seizure disorders in two groups was analyzed. This study [8]suggest that electrolyte disturbance is not a major cause of seizures except for hypocalcaemia in children from 0 to 1 years

Table No. 1:- Distribution of Serum electrolyte

Sr.No.	Serum Electrolytes	Normal Value	Mean Value	Std. Deviation (x - x)2	Std. Error of mean
1	Sodium	135 - 145 meq/l	138.76 meq/l	15093.9	0.22

2	Potassium	3.5 - 4.5 meq/l	4.15 meq/l	633.6	0.05
3	Calcium	7 - 11 meq/l	8.25 meq/l	32.99	0.11

Table No. 2 :- Association of Serum Electrolyte disturbances in Study population

Serum Electrolytes		Group 1 Diseased/	Group 2	Total	Chi square value x2	p value
Sodium	Decreased	7	8	15	2.11	>0.1
	Normal	9	26	35		
	Total	16	34	50		
Potassium	Decreased	3	3	6	0.2	>0.5
	Normal	13	31	44		
	Total	16	34	50		
Calcium	Decreased	8	1	9	16.32	<0.01
	Normal	8	33	41		
	Total	16	34	50		

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