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Serum Magnesium, Calcium, Zinc in Infantile Tremor Syndrome

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Infantile tremor syndrome (ITS) is a condition peculiar to this country, characterized by tremors, anemia, skin pigmentation and nutritional deficiency in a plump child. Many theories on the etiopathogenesis have been postulated but none seems convincing(1,2). Many workers have tried to correlate the symptoms with certain trace element deficiency states without satisfactory results. In order to find out the relation of levels of serum magnesium, calcium and zinc to etiopathogenesis of ITS, this study was undertaken.

Material and Methods

The present study was carried out on 32 patients with clinical diagnosis of infantile tremor syndrome admitted to Umaid Hospital for Women and Children, Dr. S.N. Medical College, Jodhpur. An equal number of age and sex matched normal children served as controls. The patients of ITS were further classified in two weight groups: weighing more than 60% and less than 60%(3). The extent of tremors, as to the part of body involved, was carefully noted. The levels of serum magnesium, calcium and zinc were detected by atomic absorption spectrophotometer (Model No. SP 90; Pye Unichem)(4).

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Results

Age and sex distribution of patients and controls is shown in *Table I.* All the patients were less than 2 years of age and 53.13% patients belonged to the age group 6-12 months.

The mean levels of serum magnesium, calcium and zinc in ITS and controls are shown in *Table II.* The mean serum magnesium level was markedly reduced while mean serum calcium and zinc were marginally reduced. Mean serum levels of magnesium, caclium and zinc were significantly reduced in cases of ITS with less than 60% weight (Grades III and IV malnutrition). The relation of mean serum magnesium levels and extent of tremors is shown in the *figure.*

Discussion

Mean serum magnesium level was markedly reduced in patients of ITS as compared to controls, the difference being highly significant ($p<0.001$). Chapparwal studied magnesium levels in cerebrospinal fluid (CSF) and serum in 25 patients of ITS; 80% had markedly low levels of magnesium in CSF and 36% had frank hypomagnesemia(5). Gerald reported that

TABLE I—*Age and Sex Distribution of Patients and Controls*

Age groups (mo)	Patients (Infantile tremor syndrome)			Controls		
	Male	Female	Total	Male	Female	Total
0– 6	1 (3.1)	1 (3.1)	2 (6.3)	1 (3.1)	1 (3.1)	2 (6.3)
6–12	10 (31.4)	7 (21.9)	17 (53.1)	9 (28.1)	7 (21.9)	16 (50.0)
12–18	3 (9.4)	3 (9.4)	6 (18.8)	3 (9.4)	2 (6.3)	5 (15.6)
18–24	5 (15.6)	2 (6.3)	7 (21.9)	6 (18.8)	3 (9.4)	9 (28.1)
Total	19 (59.4)	13 (40.6)	32 (100.0)	19 (59.4)	13 (40.6)	32 (100.0)

Figures in parentheses indicate percentages.

TABLE II—*Serum Magnesium, Calcium and Zinc Levels*

	Number	Mean serum levels (±SD) (mg/dl)		
		Magnesium	Calcium	Zinc
Infantile tremor syndrome				
Weight <60%	13	0.90 (± 0.29)	8.81 (± 1.55)	90.23 (± 12.31)
Weight >60%	19	1.48 (± 0.61)	9.26 (± 2.13)	136.63 (± 23.91)
t value*		3.45	2.41	5.63
'p' value		<0.001	<0.05	<0.01
Total	32	1.26 (± 0.58)	8.67 (± 2.06)	117.78 (± 30.74)
Controls	32	2.18 (± 0.42)	9.20 (± 1.83)	124.31 (± 34.62)
't' value**		7.04	1.07	0.78
'p' value		<0.001	>0.05	>0.05

* Students 't' test comparing weight categories in ITS.

** Students 't' test comparing ITS cases with controls.

tremors may be seen with hypomagnesemia(6).

A graph shown in the *Figure* showed a direct relationship between mean serum magnesium levels and extent of tremors, *i.e.*, as serum magnesium levels were decreasing, extent of tremors was increasing. Since hypomagnesemia is a metabolic disorder, it is expected to give rise a generalized rather than localized abnormality of

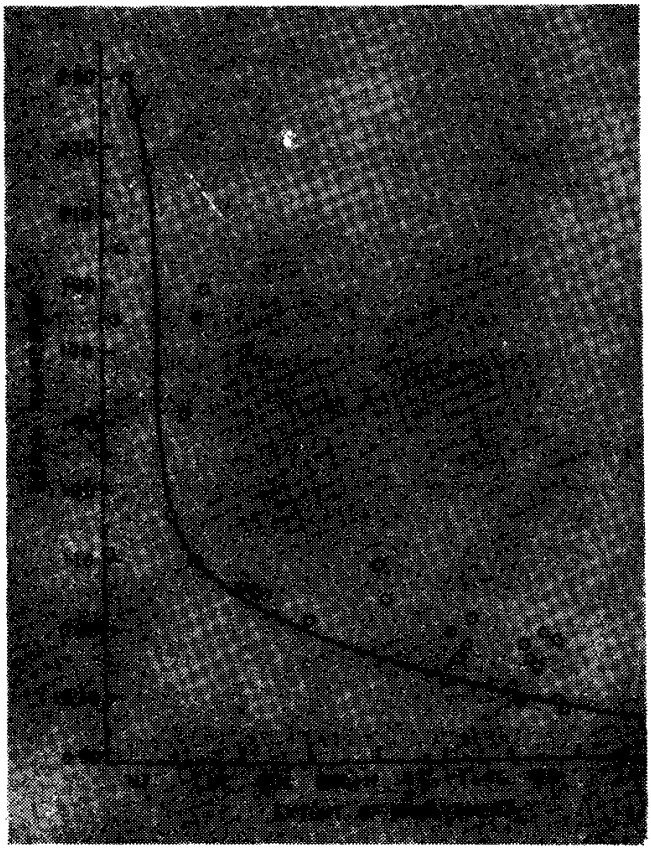

Fig. Relation of serum magnesium to extent of involvement of tremors.

central nervours system, hence we have to consider other etiological possibilities also, like viral infection. However, the strong correlation depicted in the *Figure,* must be kept in mind.

Mean serum levels of calcium and zinc though marginally reduced, were not statistically significant ($p>0.05$). Although hypocalcemia, can occasionally lead to tremors(6), serum calcium levels in ITS are usually reported to be normal(7). Moreover, change in serum calcium levels may occur secondary to low levels of serum magnesium.

Patients with severe malnutrition (weight less than 60%) had significantly reduced levels of calcium ($p<0.05$) and zinc ($p<0.01$) as compared to those having weight >60% of normal thus indicating that low levels of serum calcium and zinc are due to associated nutritional deficiency.

Thus, it might be concluded that low levels of serum magnesium may have a role in etiopathogenesis of ITS.

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