

To Estimate Vitamin B₁₂ Level and Folate in Children with Infantile Tremor Syndrome

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Conflict of interest: Nil

Abstract

Background: Infantile Tremor Syndrome (ITS) is a clinical state characterized by tremors, anemia, pigmentation of skin, regression of milestones, and hypotonia of muscles in infant and young children. Exact incidence of infantile tremor syndrome (ITS) is not known but it was accounted for 0.2 to 2% in paediatric hospital admissions in 1962 and reduced to 0.2% currently in India. Aims of this study to estimate Vitamin B₁₂ level and folate in children with Infantile Tremor Syndrome.

Methods: This Hospital based cross-sectional observational study was conducted in the Department of Biochemistry, XYZ Medical College, District, State, India. Study duration was from xy-2022 to xz-2022.

Results: The mean serum B₁₂ level was highest in children aged 13-18 months (117.40 pg/ml) and was lowest in children aged 6-12 months (67.90 pg/ml). This difference in B₁₂ level in different age groups was statistically not significant ($p>0.05$). The mean serum folate level was highest in children aged 6-12 months (17.32 ng/ml) followed by children aged 13-18 months (15.53 ng/ml) and was lowest in children aged >18 months (13.70 ng/ml). This difference in folate level in different age groups was statistically not significant ($p>0.05$).

Conclusion: Present study findings suggest that serum vitamin B₁₂ and folate levels are decreased in children with Infantile Tremor Syndrome.

Keywords: Infantile tremor syndrome, Vitamin- B₁₂, Folate level.

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Introduction

Infantile Tremor Syndrome (ITS) is a clinical state characterized by tremors, anemia, pigmentation of skin, regression of mile stones, and hypotonia of muscles in infant and young children. [1] The disorder has various other names, like, nutritional dystrophy and anemia, infantile meningoencephalitic syndrome, syndrome of tremors, mental regression and anemia, in malnourished children. As the tremors are the dominant feature of this disorder the term infantile tremor syndrome (ITS) gained popularity. [2,3,4]

Exact incidence of ITS is not known but it was accounted for 0.2 to 2% paediatric hospital admissions in 1962 and reduced to 0.2% currently in India. Improvement in nutritional status, living condition and better weaning practices could explain the reducing incidence rate over years [5-6]. The syndrome has been reported from Punjab, Himachal Pradesh, Gujarat, Uttar Pradesh, Bihar, West

Bengal, Jammu and Kashmir, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Karnataka, Rajasthan, New Delhi, and Chandigarh. Cases of ITS are generally encountered throughout the year. [7] Some authors have found more cases of ITS during summer and winter/rainy seasons. [8,9,10]

Materials and Methods

Study Place:-

Study Design:-Hospital based cross sectional observational study

Sample Size: Sample size was calculated with 95% confidence level and alpha error 0.05, assuming 80% power of study and has vitamin B₁₂<200 and folate <5 in 80% of cases, as per reference article¹⁰ with an absolute error of 12% required sample size was 45 cases of ITS.

Inclusion Criteria

(A) Children presenting with following clinical features of ITS

1. Tremors – localized/generalized,
2. Hair and knuckle pigmentation
3. Pallor
4. Delayed Milestones / Psychomotor Retardation,
5. Organomegaly

(B) Parents given written consent for participation in study.

Exclusion Criteria

1. Known neurological illness
2. Tremors due to any other explainable cause
3. On vitamin B₁₂ and folate therapy
4. Received blood transfusion in past 3 months before admission
5. Refusal for participation in study

Results

Table 1: Distribution of study subjects in relation with age group and Serum Vitamin B₁₂ levels and serum folate

Age (months)	Serum Vitamin B ₁₂ Levels (pg/ml)		Serum Folate (ng/ml)	
	Mean	SD	Mean	SD
6-12	67.92	53.02	17.32	6.25
13-18	117.40	88.07	15.53	7.18
>18	73.04	53.87	13.70	8.94
P value	0.090 (NS)		0.508(NS)	

The mean serum B₁₂ level was highest in children aged 13-18 months (117.40 pg/ml) and was lowest in children aged 6-12 months (67.90 pg/ml). This difference in B₁₂ level in different age groups was statistically not significant (p>0.05). The mean serum folate level was highest in children aged 6-12

months (17.32 ng/ml) followed by children aged 13-18 months (15.53 ng/ml) and was lowest in children aged >18 months (13.70 ng/ml). This difference in folate level in different age groups was statistically not significant (p>0.05).

Table 2: Distribution of study subjects in relation with sex and Serum Vitamin B₁₂ levels and serum folate

Sex	No. of Patients (n=45)	Serum Vitamin B ₁₂ Level		Serum folate	
		Mean	SD	Mean	SD
Male	31 (68.9%)	83.99	59.56	15.67	6.64
Female	14 (31.1%)	76.58	81.74	18.27	6.72
P value	0.733 (NS)			0.232 (NS)	

The most of the children were males (68.9%) and 14 (31.1%) children were females. The mean serum B₁₂ level was higher in male children (83.99 pg/ml) as compared to females (76.58pg/ml). This difference in B₁₂ level in different gender was statistically not significant (p>0.05). The mean serum folate level was higher in female children (18.27 ng/ml) as compared to male children (15.67 ng/ml). This difference in folate level in different gender was statistically not significant (p>0.05).

Discussion

Most of the children were aged 6-12 months (62.2%) with mean age of 9 months followed by 13-18 months (26.7%). The mean serum B₁₂ level (117.40 pg/ml) was highest in children aged 13-18 months and was lowest in children aged 6-12 months (67.90 pg/ml) (Table No. 1). This difference in B₁₂ levels in different age groups was statistically not significant. Mean serum folate level (17.32 ng/ml) was highest in children aged 6-12 months and was lowest (13.70 ng/ml) in children aged >18 months (Table No. 14). This difference in folate level in different age groups was however statistically not significant. Compared to our study

Siroliya V et al. [10] and Gautam P et al. [11] have similar affected age group. In contrast our study Sachdev et al. [12] found to higher age group

Most of the children were males (68.9%) and 14 (31.1%) were females (male female ratio 2.2:1). The mean serum B₁₂ level (83.99 pg/ml) was higher in male children as compared to females (76.58 pg/ml) (Table No. 2). This difference in B₁₂ level in the two study genders was statistically not significant. Mean serum folate level (18.27 ng/ml) was higher in female children as compared to male children (15.67 ng/ml) (Table No. 15). This difference in folate level in different gender was however statistically not significant. Similar to our study Mahajan CM et al. [13], Rajput KS et al. [14] and Gautam P et al. [11] found male pre dominance. In Contrast to our study Siroliya V et al. [10] and Kumar A et al. [15] found equal affected of both sexes.

Conclusion

Present study findings suggest that serum vitamin B₁₂ and folate levels are decreased in children with Infantile Tremor Syndrome.

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