STUDY OF CLINICO- EPIDEMIOLOGICAL PROFILE OF PATIENTS ADMITTED WITH INFANTILE TREMOR SYNDROME (ITS) AND STATUS OF TRACE ELEMENTS (ZINC, COPPER) DEFICIENCY IN THEM

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ABSTRACT

BACKGROUND

Under nutrition is one of the major problems in the field of Paediatrics. The greatest risk of malnutrition is in the first two years of life. The effects of this early damage on health, brain development, intelligence, educability and productivity are potentially reversible. The current study was an attempt to find out the clinico epidemiological profile, evaluate them for trace elements deficiency and most appropriate management options in those who are admitted with infantile tremor syndrome.

MATERIALS AND METHODS

The current study was a hospital based cross sectional study that was conducted in the Department of Paediatrics, Dr. S. N. Medical College Jodhpur. Duration of study was One Year. Any child up to the age of three years of age admitted in the paediatric wards with typical features of infantile tremor syndrome.

RESULTS

Maximum numbers of patients were found between 6 months to 12 months of age, there was slight male predominance. The majority of infants in our study (85%) were exclusively breast fed, 66% of cases were having low serum Copper level. 9% of cases were having low serum zinc level. 8% of cases were having low serum copper level with tremors.

CONCLUSION

In our study the fact that NTS is mainly seen in children who are exclusively breast feed for a longer period with delayed introduction of weaning foods. The main presenting features remain developmental delay, hyper pigmentation and anemia. Among nutritional factors, deficiency of copper and zinc in children plays a big role in development of disease. Thus to prevent the development of nutritional tremor syndrome stress should be on early timely introduction of weaning foods, especially rich in copper and zinc. What is already known about this Study- low levels of trace elements like copper and zinc may be responsible for typical clinical manifestations in patients of infantile tremor syndrome. Pronged and Exclusive breast feeding further aggravate these features. What this Study Adds- Pronged and Exclusive breast feeding along with low levels of trace elements like copper and zinc are responsible for typical clinical manifestations in patients of infantile tremor syndrome.

KEYWORDS

Infantile Tremor Syndrome (ITS), Nutritional Tremor Syndrome (NTS), Copper, Zinc.

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BACKGROUND

Under nutrition is one of the major problems in the field of Paediatrics. The greatest risk of malnutrition is in the first two years of life. The effects of this early damage on health, brain development, intelligence, educability and productivity are potentially reversible Infantile tremor syndrome is a clinical state characterized by tremors, anaemia, and pigmentary skin disease, regression of mental development and hypotonia of muscles in a plump child. A classical picture of it is a plump looking infant between 6 months to 18 months with signs of malnutrition. These children are listless, apathetic and disinterested in surroundings. Scalp hair is sparse and light coloured. Dark pigmentation is present over dorsal aspects of hands, nail folds, feet, knees, ankles, buttocks and axillae. There is regression of milestones in the recent past.

Though the disease is known for its existence for quite long but still it require lot of understanding regarding its epidemiology, aetiopathogenesis and management. The disease requires early diagnosis and appropriate treatment

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so that these children can achieve their growth developmental potential. It requires clear management protocols and guidelines as in case of protein energy malnutrition. The current study was an attempt to find out the clinico epidemiological profile, evaluate them for trace elements deficiency.

AIMS AND OBJECTIVES

This study was planned with the objectives to-

1. To study the clinico-epidemiological profile of patients admitted with infantile tremor syndrome.
2. To study the co morbidities associated with infantile tremor syndrome and to take the necessary interventions.
3. To assess their growth and developmental parameters. To study the level of trace elements (Zinc and Copper) in these children and their role in development and growth of these patients, if any.

MATERIALS AND METHODS

The current study was a hospital based cross sectional study that was conducted in the Department of Paediatrics, Dr. S. N. Medical College Jodhpur. Duration of study was One Year.

Inclusion Criteria

Any child up to the age of three years of age admitted in the paediatric ward with typical features of infantile tremor syndrome.

Exclusion Criteria

Children with known neurological disorders. A total of 47 patients with typical features of infantile tremor syndrome admitted in various paediatric wards were enrolled for the study. All patients were screened for levels of serum zinc, and Copper and their levels were correlated with their effect on child's growth and development. Effect of these trace elements will help in management and treatment of co morbidities associated in these children.

RESULTS

A total of 47 patients with typical features of infantile tremor syndrome admitted in various paediatric wards were enrolled for the study. In our study NTS was predominantly seen in 6 months to 12 months children. Only 10% of cases were seen in the age of more than 12 months. Most of patients were male with Male Female ratio of 1.35: 1.

It was observed that in our study all (100%) cases of NTS presented with pallor and hyper pigmentation, 91% cases had fever and 49% cases had cough and developmental delay. Respiratory distress, vomiting, loose motion and swelling of feet were other significant complaints in these patients. (Table-1)

Table 2 shows that majority (85%) of NTS patients were on exclusive breast feeding and only 15% cases were having some kind of complimentary feeding along with breastfeeding. (Table-2)

In present study 66% of NTS cases were having serum copper level below reference range for age and gender and 34% of cases were having within normal range. (Table-3)

In our study majority (91%) of cases were having serum zinc levels within reference range while only 9% of cases were having serum zinc level below reference range. (Table-4)

In our study 6 cases of NTS were having tremors out of which 67% cases were having serum copper deficiency and 33% cases were having normal serum copper level. (Table-5)

In our study 6 cases of NTS were having oedema out of which 83% cases were having serum copper deficiency and 17% cases were having normal serum copper level. (Table-6)

In our study 6 cases of NTS were having oedema but all cases of oedema were having normal serum zinc level. (Table-7)

In our study 6 cases of NTS were having tremors out of which 17% cases were having serum zinc deficiency and 83% cases were having normal serum zinc level. (Table-8)

In our study 40 cases of NTS were having exclusive breast feeding out of which 60%% cases were having serum copper deficiency and 40% cases were having normal serum copper level. (Table-9)

In our study 40 cases of NTS were having exclusive breast feeding out of which only 7.5% cases were having serum zinc deficiency and 92.5% cases were having normal serum zinc level. (Table-10)

In our study out of 47 cases 6 (13%) cases had tremors. Out of these 4 (67%) cases demonstrated with low serum copper level. Mean serum copper level in cases having tremors was 440.08±358.18 microgram/liter while in study cases having no tremors, mean copper level was 1002.58±655.72 microgram/liter. This difference was significant statistically ($p<0.05$) meaning there by that low serum copper level is associated with development of tremors in these children. (Table-11)

In our study out of 47 cases 6 (13%) cases had oedema. Mean serum zinc level in cases having oedema 665.53±49.79 microgram/liter while in study cases having no oedema, mean zinc level was 992.30±390.53 microgram/liter. This difference was significant statistically ($p<0.05$) meaning there by that low serum zinc level is associated with development of oedema in these children.

In our study out of 47 cases 40 (85%) cases had exclusive breast feed. Out of these 3 (7.5%) cases demonstrated with low serum zinc level. Mean serum zinc level in cases having exclusive breast feed 884.01±322.34 microgram/liter while in study cases having breast feed plus top feed, mean zinc level was 1331.00±488.08 microgram/liter. This difference was significant statistically ($p<0.01$) meaning there by that low serum zinc level and breast feeding have correlation in these patients. (Table-12)

Complaints	Number of Cases (%)
Pallor	47 (100%)
Hyper pigmentation of skin	47 (100%)
Fever	43 (91%)
Cough	23 (49%)
Developmental delay	23 (49%)
Tremors (Abnormal movements)	6 (13%)
Vomiting	11 (23%)
Loose motion	6 (13%)
Swelling of feet	6 (13%)
Respiratory distress	20 (43%)

Table 1. Presenting Complaints

Feeding History	Number of Patients (%)
Exclusive Breast feed	40 (85%)
Breast feed plus top feed	7 (15%)
Total	**47**

Table 2. Dietary Status wise Distribution

Serum Copper	Number of Cases (%)
Below normal	31 (66%)
Normal level	16 (34%)
Total	47 (100%)

Table 3. Serum Copper Status in Study Cases

Serum Zinc	Number of Cases (%)
Below normal	4 (9%)
Normal level	43 (91%)
Total	47 (%)

Table 4. Serum Zinc Status in NTS cases

Serum Copper	Tremors (%) n=6
Below normal	4 (67%)
Normal level	2 (33%)

Table 5. Correlation of Tremors with copper

Serum Copper	Oedema (%) n=6
Below normal	5 (83%)
Normal level	1 (17%)

Table 6. Correlation of Oedema with Copper

Serum Zinc	Oedema (%) n=6
Below normal	Nil
Normal level	6 (100%)

Table 7. Correlation of Oedema with Zinc

Serum Zinc	Tremors (%) n=6
Below normal	1 (17%)
Normal level	5 (83%)

Table 8. Correlation of Tremors with Zinc

Serum Copper	Exclusive Breast Feeding (%) n=40
Below normal	24 (60%)
Normal level	16 (40%)

Table 9. Correlation of Exclusive Breast Feeding with Copper

Serum Zinc	Exclusive Breast Feeding (%) n=40
Below normal	3 (7.5%)
Normal level	37 (92.5%)

Table 10. Correlation of Exclusive Breast Feeding with Zinc

Sl. No.	Groups	No.	Mean±SD	P value
1.	Tremor No Tremor	6 41	440.08±358.18 1002.58±655.72	0.0468 (<0.05)
2.	Oedema No Oedema	6 41	833.10±818.98 945.07± 633.97	0.6985
3.	Exclusive Breast Feed BF plus Top feed	40 7	955.16±703.81 791.42±54.51	0.5451

Table 11. Showing Mean Serum Copper Level in Different Clinical Groups

Sl. No.	Groups	No.	Mean±SD	P value
1.	Tremor No Tremor	6 41	845.46±216.51 965.97±398.79	0.4752
2.	Oedema No Oedema	6 41	665.53+49.79 992.30±390.53	0.0485 (<0.05)
3.	Exclusive Breast Feed BF plus Top feed	40 7	884.01±322.34 1331.00±488.08	0.0031 (<0.01)

Table 12. Showing Mean Serum Zinc Level in different Clinical Groups

DISCUSSION

The present study was conducted in the department of Paediatrics, Dr. S. N. Medical College Jodhpur. A total of 47 patients with typical features of infantile tremor syndrome admitted in various paediatric wards were enrolled for the study.

We observed that maximum numbers of patients were found between 6 months to 12 months of age in present study (66%). Sachdev et al[1], Bajpai et al[2], Garg and Srivastava.[3], Mathur et al[4], Deshpande and Ingle.[5] Agarwal and Katiyar.[6] Ghai.[7] reported that children in age group of 6 to 18 months were predominantly affected by this disease.

In the current series there was slight male predominance (57% males, 43% females), this is in accordance with hospital admission in which 62.11% children admitted were males, which may be reflection of our society where male children are cared better. Similarly Chhaparwal et al[8] also

did not observe any significant difference in sex distribution. Bajpai et al[2] found males to be twice as often affected as females. Agarwal and Katiyar.[6] reported that males were 5.2 times more involved than females. Gupta et al[9], Ghai.[7] and Ratageri et al[10] also reported that males preponderance in their respective studies.

The majority of infants in our study (85%) were exclusively breast fed, though nearly 15% were receiving additional food also. Mathur et al[4], Garg et al[3], Dikshit.[11], Jadhav et al[12], Sachdev et al[1], Srikantia and Reddy.[13], Deshpande and Ingle.[5], Agarwal and Katiyar.[6] and Ramkumar and Pandove.[14] reported the syndrome in exclusively breast fed infants.

The presenting complaints in majority of patients were pallor in 100%, fever in 91%, and cough in 49% vomiting in 23%, loose motion in 13% and tremors in 13% as shown in. This indicate that majority of patients were having intercurrent illness particularly infections which might be due to late weaning and faulty feeding in these children. Our observations were supported by Sachdev et al[1]

In our study out of 47 cases 6 (13%) cases had tremors. Out of these 4 (67%) cases demonstrated with low serum copper level. Mean serum copper level in cases having tremors was 440.08±358.18 microgram/liter while in study cases having no tremors, mean copper level was 1002.58±655.72 microgram/liter. This difference was significant statistically ($p<0.05$) meaning there by that low serum copper level is associated with development of tremors in these children. This important observation may help in management and prevention of tremors in children with NTS.

In our study out of 47 cases 6 (13%) cases had oedema. Mean serum zinc level in cases having oedema 665.53±49.79 microgram/liter while in study cases having no oedema, mean zinc level was 992.30±390.53 microgram/liter. This difference was significant statistically ($p<0.05$) meaning there by that low serum zinc level is associated with development of oedema in these children. This important observation may help in management and prevention of oedema in children with NTS.

In our study out of 47 cases 40 (85%) cases had exclusive breast feed. Out of these 3 (7.5%) cases demonstrated with low serum zinc level. Mean serum zinc level in cases having exclusive breast feed 884.01±322.34 microgram/liter while in study cases having breast feed plus top feed, mean zinc level was 1331.00±488.08 microgram/liter. This difference was significant statistically ($p<0.01$) meaning there by that low serum zinc level and breast feeding have correlation in these patients. This important observation may help in management and prevention of NTS.

CONCLUSION

In our study the fact that NTS is mainly seen in children who are exclusively breast feed for a longer period with delayed introduction of weaning foods. The main presenting features remain developmental delay, hyper pigmentation and anaemia. Among nutritional factors, deficiency of copper and zinc in children plays a big role in development of disease.

Thus to prevent the development of nutritional tremor syndrome stress should be on early timely introduction of weaning foods, especially rich in copper and zinc.

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