Original Research Article

Role of serum zinc level in simple febrile seizures: A hospital based study from rural area of Maharashtra

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Abstract

Introduction: Febrile Convulsion is the most common type of seizure in children between 5 months to 6 years of age. Low levels of serum zinc suggestive of increased incidence of simple febrile seizure. **Aim:** The aim of this study is to estimate serum zinc level in children with simple febrile seizure and to correlate the levels of serum zinc in simple febrile seizure. **Materials and Methods:** This hospital based prospective case control study was carried out at Noor Hospital, JIIU'S IIMS and R, Warudi Tq. Badnapur Dist. Jalna, Maharashtra between 1 Jan 2015 to 31 Dec 2016. This study includes infants and children between 6 month to 5 years of age. The total number of 120 patient fulfilling the inclusion criteria were included in Group A, while in Group B 120 control were taken for the study. Detailed history and clinical examination were carried out. **Results:** In our study it is found that there is slight male preponderance of 67% in cases and 63% in controls. In cases mean serum zinc level was 62.5±3.43 mgm/dl, while in controls it was 72.14±7.39 mgm/dl, Mean serum zinc level was 9.64 ugm/dl less in cases of simple febrile seizure as compared to control which is highly significant [P<0.01]. **Conclusion:** This study shows that serum zinc levels are decreased in children with febrile seizures. So zinc supplement is to be given in all patient of febrile convulsion.
Key Worlds: Febrile Seizure, Serum Zinc Level.

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INTRODUCTION

Febrile Convulsion is the most common type of seizure in children between 5 months to 6 years of age. As we know, seizure is caused by abnormal electrical discharge inside the brain.[1] The incidence of seizure among the children is approbatory 30%.[2,3] Febrile Convulsion is defined as seizures in normal healthy children between 5 months to 6 year of age with fever more than 38.4 c but without any intracranial infections and no past history of febrile convulsion. The most common cause for febrile seizure is low serum zinc and iron levels.[4] Trace element like zinc etc plays a vital role in brain functions, development and prevention of neurological disorder. The aim of this study is to estimate serum zinc level in children with simple febrile seizure and to correlate the levels of serum zinc in simple febrile seizure.

MATERIALS AND METHODS

This hospital based prospective case control study was carried out at Noor Hospital, JIIU'S IIMS and R, Warudi Tq. Badnapur Dist. Jalna, Maharashtra between 1 Jan 2015 to 31 Dec 2016. This study includes infants and children between 6 month to 5 years of age. The parents or guardian of all those patients, includes in the study has given written consent the only patient had normal febrile seizure, with normal development were included in the study. Those patients gave the history of recent zinc intake, development delay malnourished baby or neurological deficit, acute or chronic diarrhoea or electrolyte imbalances were excluded from the study. In each individual axillary temperature were recorded, the general examination and systemic examination were carried out in detail. Under all aseptic precaution 3 ml of blood from veni puncture using 23 sterile needles, within

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24 hours of contact of patient in both groups. Sample was centrifuged and serum is obtained and well preserved sterile deionized vial. Estimation of same zinc level done by colorimetric. Test kits, there are two groups, Group A includes all the patients and Group B includes all the controls. The total no. Of patients in groups A is 120, the total no. Of control taken for the study includes in group B are 120.

Statistical Analysis: Data was analyzed using MS Excel and Minitab version 15.0 for windows. Qualitative data was expressed in form of percentage. Zinc level presented as mean and standard deviation, the difference in mean among the groups was assessed by using unpaired t-test. P- value less than 0.05 were taken as statistically significant

RESULTS

Table 1: Age wise distribution between two groups

Age Group (in months)	Group A (cases) = 120		Group B (controls) = 120	
	No.	%	No.	%
6-12	44	36.67%	32	26.67%
12-24	42	35%	47	39.16%
24-36	18	15%	29	24.17%
36-48	9	7.5%	6	5%
46-60	7	5.83%	6	5%

Table 1 shows agewise distribution between Cases [Group A] and controls [Group B].

Table 2: Sex wise distribution between two groups

Sex	Group A (cases) n=120		Group B (controls) n=120	
	No.	%	No.	%
Male	67	55.83%	63	52.50%
Female	53	44.17%	57	47.50%
Total	**120**	**100%**	**120**	**100%**

Table 2 shows sexwise distribution between Cases [Group A] and controls [Group B] and shows male predominance in both Cases [Group A] and controls [Group B].

Table 3: Distribution of diagnosis according two groups

Diagnosis	Group A (cases)		Group B (controls)	
	No.	%	No.	%
Acute Respiratory Infection (ARI)	30	25%	53	44.17%
Viral Fever	70	58.33%	56	46.66%
Urinary Tract Infection (UTI)	6	5%	5	4.17%
Acute Suppurative Otitis Media (ASOM)	14	11.67%	6	5%
Total	**120**	**100%**	**120**	**100%**

Table 3 shows distribution of diagnosis according two groups, which shows us the cause of fever mainly is viral fever followed by acute respiratory infection, acute suppuraive otitis media, and urinary tract infection.

Table 4: Comparison of mean serum zinc level between two groups

Variables	Serum Zinc level (ugm/dl)	Mean difference	P - value
Group A	62.5±3.43	-9.642	0.000 HS
Group B	72.14±7.39		

HS- Highly Significant (P<0.01)

Table 4 shows comparison of mean serum zinc level between two groups Mean serum zinc level was 9.64 ugm/dl less in cases of simple febrile seizure as compared to control which is highly significant [P<0.01]

Table 5: Comparison of Zinc deficiency among two groups

Zinc level	Group A		Group B		Total	
	No.	%	No.	%	No.	%
<65 µgm/dl	78	65%	36	30%	114	47.50%
>65 µgm/dl	42	35%	84	70%	126	52.50%
Total	**120**	**100%**	**120**	**100%**	**240**	**100%**

Table 5 shows us comparisons of hypozincemia among two groups in group A number of cases of hypozincemia are 65%, while in control group are 30%.

DISCUSSION

Febrile seizure is a common neurological problem in children. Aetiopathogenesis of febrile seizure is unknown. Majority of factors responsible for febrile seizures are as follows genetic factors,[5] family background,[2 original], iron deficiency[7,8], immunological disorder[11] and zinc deficiency[9,10]. For good functioning of nervous system, the role of zinc is very important. It has been discussed in various literature[15,16]. Zinc level is mainly located in hippocampus area. Zinc acts as a neurotransmitter and improves the communicating and locomotive function and also evolution of nervous system. Hypozincemia leads to febrile seizures[16] In patients of febrile seizures the cause of low serum levels of zinc is not known, however the fever and acute infection plays a vital role in developing such conditions[13]. It is belived that the release of tumour necrosis factor [TNF] and interleukin [IL] during fever or tissue injury may result in reduction of serum zinc level [6] Group A represents the cases while Group B represents the controls. In both groups we have taken 120 cases and 120 controls in Group A and Group B respectively. In the present study, near about two third of the patients (72%) were below 2 years of age with male predomance was there. Male to female ratio was 1.72:1. This was similar to the gender ratio ranging from [[1.4- 1.7]: 1] as reported by [10,12,13,16-20] In our study the main cause of febrile seizure was viral fever in Group A [70%], followed by Acute respiratory infection [30%], Acute suppurative otitis media [14%] Urinary tract

infection [6%]. Margaretha and Gunduz [13,18,21] have reported acute respiratory infection is the main cause. Most of the authors they have compared serum zinc level with febrile seizure cases and control group, while others have also studied the number of cases having hypozincemia in a given subject population. In the present study data was analyzed by both these methods. As per the recommendation of World Health Organisation [WHO] the cut-off value for hypozincemia has taken as 65mgm/dl[22] No statistical difference was found in the mean age, gender distribution, physical parameters and nutritional status between the patients of hypozincemia and normal zinc level. Mahyar *et al* also reported the same findings[18] In the present study highly significant difference of 9.64 mg/dl was obtained in mean serum zinc level in cases [Group A] as compared to controls [Group B] [p< 0.000 – Highly Significant]. The researchers also shows the similar findings [12,18,20,24]. The present study shows that no specific age group or gender is responsible for hypozincemia. In the present study, hypozincemia was observed to be more common in children with febrile seizures

CONCLUSION

This study shows that serum zinc levels are decreased in children with febrile seizures. The level of zinc plays a vital role in the pathogenesis of febrile seizures. So in all patients of febrile convulsion zinc supplement should be given.

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