

Serum Magnesium Level in Febrile Convulsions

Dr. Sherlin¹, Dr. Balu Ramu²

¹MBBS, Post Graduate, Division of Paediatrics Rajah Muthiah Medical College, Annamalai University
Chidambaram-608002, Cuddalore district, Tamilnadu, India

²M.D, D.C.H, Professor, Division of Paediatrics, Rajah Muthiah Medical College,
Annamalai university, Chidambaram-608002, Cuddalore district, Tamilnadu, India

Abstract: *This study was designed to estimate the levels of serum magnesium in children with febrile convulsions. The aim of this study is to compare serum magnesium levels between children with febrile convulsion and with normal children. This case-control study revealed that there is a positive correlation between serum magnesium levels and febrile convulsion.*

Keywords: serum magnesium, febrile convulsion

1. Materials and Methods

1.1 Place of study

This study was conducted in Department of Paediatrics, Raja mutiah medical college, chidambaram after approval of Institutional ethics committee.

1.2 Type and duration of study

This study was duration based prospective analytical case control study for a period of one year from july 2013 to june 2014.

1.3 Inclusion criteria

- Children between the ages of 6 months to 5years who were developmentally normal with febrile convulsion.
- Children with febrile convulsion admitted for the first time to our hospital.
- Age matched subjects admitted with minor ailments with no convulsion were taken as controls.

1.4 Exclusion criteria

- Children with history of congenital anomalies of CNS, neonatal seizure, neuro infection and other metabolic conditions causing seizure.
- Children who had received magnesium supplements.
- Children with febrile convulsion who were admitted for the second time and evaluated previously in our institution.

2. Data Collection

Patients who were eligible after screening for inclusion and exclusion criteria were included in the study. Study was started after obtaining the signed written informed consent from the patient's care taker.

3. Objectives

- 1) To estimate the levels of serum magnesium in children with febrile convulsion.

- 2) To compare serum magnesium levels between children with febrile convulsion and with normal children.

4. Serum Magnesium and Febrile Convulsion

Febrile convulsion is one of the most common seizure disturbances in children with an approximate rate of 2 to 5 percent. Febrile seizures are seizures that occur between the age of 6 months and 60 months with a temperature of 38°C or higher, that are not the result of central nervous system infection or any metabolic imbalance, and that occur in the absence of a history of prior afebrile seizures. Each child who presents with a febrile seizure requires a detailed history and a thorough general and neurological examination.¹

Magnesium is the fourth common cation in the body and the third most common intracellular cation. 50 to 60% of body magnesium is in bone, where it serves as a reservoir because 30% is exchangeable, allowing movement to the extracellular space. Most intracellular magnesium is bound to proteins; only about 25% is exchangeable. Because cells with higher metabolic rates have higher magnesium concentrations, most intracellular magnesium is present in muscle and liver. The normal plasma magnesium concentration is 1.5 to 2.3 mg/dl. Magnesium is essential for membrane stabilization and nerve conduction¹

Magnesium is involved in neuronal function and it inhibits the facilitatory effects of calcium on synaptic transmission and also exerts a voltage dependent blockage of N-methyl-D- aspartate (NMDA) receptor channel. Low serum magnesium has occasionally been associated with significant effects on the central nervous system especially in epilepsy. A positive correlation of relationship between low levels of serum Magnesium and predisposition to febrile convulsions in children has been found.²

It has been suggested that low serum Mg has occasionally been associated with significant effects on the central nervous system especially in epilepsy. A recent study done in Egypt in 2013 in Ain Shams University and National Research Center Egypt to asses the blood levels of trace elements in familial febrile convulsions concluded that serum selenium and magnesium levels was significantly low

and logistic regression model in their study showed that Selenium and Magnesium have protective effects in children with febrile convulsions.³

In this case-control study, we found a significant difference between the levels of serum magnesium in children with and without febrile convulsions. The levels of serum magnesium are normal in 34 patients with febrile convulsion (68%) and low levels were seen in 16 cases (32%). Serum magnesium levels were normal in all 50 controls.

5. Summary

The following are the summary of this study:

- The commonest cause for fever in children with febrile convulsion is upper respiratory tract infection.
- Family history of febrile convulsion is seen in 20% of cases.
- Serum calcium levels were normal.
- Serum Magnesium levels were low in 32% of the cases with febrile convulsion.

6. Conclusion

In this case-control study the serum Magnesium levels has got positive correlation in patients with febrile convulsion. However further studies are required with large number of cases to establish the strong positive correlation of serum Magnesium and febrile convulsion.

References

- [1] Nelson textbook of pediatrics: Robert M. Kliegman, MD, Richard E. Behrman, MD, Hal B. Jenson, MD and Bonita F. Stanton, MD 19th edition 2011
- [2] Journal of Pediatric Neurology 2007;5:39-44. Mishra OP, Prasad R, Singh AR, Das BK, Upadhyay RS, Singh TB. Cerebrospinal fluid zinc, magnesium, copper and gamma- aminobutyric acid levels in febrile seizures.
- [3] Macedonian Journal of Medical Sciences. 2014 Mar 15; 7(1):68-73. Assessment of the Level of GABA and Some Trace Elements in Blood in Children who Suffer from Familial Febrile Convulsion. Osama et al.
- [4] Ahmad Talebian, Zarichehr Vakili, Safar Ali Talar: Assessment of the Relation between Serum Zinc & Magnesium Levels in Children with Febrile Convulsion. Iranian Journal of Pathology (2009)4 (4), 157 – 160
- [5] J Mazand Univ Med Sci 2012; 22(90): 45-50(Persian) serum level of magnesium in children with febrile seizure. Ali Abbaskhaniyan et al.