

Original article

Iron status and its relation to simple febrile seizures in children

¹Dr Ravi Bhatia, ²Dr. Gunjan Bhatia

¹MBBS,DNB,PGDAP, Assistant Professor , Dept. Of Pediatrics, Pacific medical College, Udaipur.

²MBBS, DCP, Consultant Pathologist, GBH American Hospital, Udaipur.

Affiliation: Dept. of Pediatrics, Pacific Medical College, Udaipur, Rajasthan.

Corresponding author: Dr. Ravi Bhatia

Abstract:

Introduction: Simple Febrile Seizures are the commonest seizures occurring in childhood. Various studies have focused on the etiological factors behind the occurrence of such seizures.

Material and Methods Children with first episode of simple febrile seizure reporting to the clinic were included in the study. The study period was from jan 2012- may 2014. Simple febrile seizure was defined as a episode of seizure occurring in children between 6 months and five years of age associated with fever but without any evidence of intra cranial infection or other known causes of childhood seizures. Children with history of seizures, developmental delay, intra cranial infection were excluded from the study.

Results : In our study majority cases 16 (59.2%) had an underlying respiratory illness which in all probability could be viral in origin. The genetic contribution to incidence of febrile seizures is manifested by a positive family history and in some cases a history of epilepsy in the family⁽¹⁾. In our study 12 cases(44.4%) had a positive family history of either febrile seizures or epilepsy.

Conclusion: To conclude low serum ferritin levels are seen in children with simple febrile seizures and it play a role in causation of the illness, however larger studies may be needed to arrive at a definitive cause effect relationship.

Introduction:

Simple Febrile Seizures are the commonest seizures occurring in childhood.⁽¹⁾ Various studies have focused on the etiological factors behind the occurrence of such seizures. Studies have attempted to identify various risk factors including family history, antenatal history.^(2,3) Iron is involved in the metabolism of various neurotransmitters and enzymes like mono amine oxidase and aldehyde oxidase are reduced in children with iron deficiency anemia. The role of Iron deficiency in behavioural problems among children is quite well known. Piscane et al⁽⁴⁾ reported that Iron deficiency was

common in children with febrile seizures whereas Kobrinsky et al⁽⁵⁾ reported that iron deficiency lowered the threshold for seizures among children. Daoud et al⁽⁶⁾ have also reported that the level of serum ferritin is lower in children with simple febrile seizures. The present study was designed to study the iron status in children with simple febrile seizures.

Material and Methods

Children with first episode of simple febrile seizure reporting to the clinic were included in the study. The study period was from jan 2012- may 2014. Simple febrile seizure was defined as a episode of seizure occurring in children between 6 months and five

years of age associated with fever but without any evidence of intra cranial infection or other known causes of childhood seizures. Children with history of seizures, developmental delay, intra cranial infection were excluded from the study. Children having atypical or complex febrile seizures were also excluded from the study. Detailed history, neurological exam was recorded in all cases . Complete blood count, peripheral smear examination

and serum ferritin were the investigations done in all the cases. Complete blood count was done on 17 part trans asia analyzer while the peripheral blood film was done by a pathologist. The study group comprised of 27 children who satisfied the inclusion criteria. Hemoglobin of less than 10.5gm/dl, MCV less than 75fl and Serum Ferritin less than 12ng/ml were taken as markers of Iron deficiency.⁽⁷⁾

Results

A total of twenty seven children were included in the study, out of the twenty seven children 18 were males and 9 were females. The mean age of the study group was 21 months.

Table 1 Demographic characteristics of the study group.

S.no	Age group	Males	Females
1.	9months-12 months	00	02
2.	12 months-24 months	12	05
3.	24 months- 60 months	06	02

Majority of children had fever on admission. The commonest underlying infection accompanying febrile seizure was respiratory tract infection.

Table-2 Characteristics of fever, family history and underlying infections.

Sno.	Characterstics	Males	Females
1.	Fever	14	06
2.	Family history of Febrile seizure	04	04
3.	Family history of Epilepsy	02	02
4.	Accompanying Respiratory Tract Infection	10	06
5.	Accompanying Gastroenteritis	04	03
6.	Pyoderma	01	00
7.	Non specific Underlying illness	03	00

Table-3 Hematological Characteristics of the study group

Sno	Hematological Indices	Males	Females
1.	Haemoglobin < 10.5 gm/dl	12	06
2.	MCV <75 fl	12	06
3.	Serum Ferritin < 12 ng/ml	08	04
4.	PBF suggestive of Microcytic hypochromic anemia	12	06

Discussion

In most cases of febrile seizures an underlying viral illness is the common cause⁽¹⁾. In our study majority cases 16 (59.2%) had an underlying respiratory illness which in all probability could be viral in origin. The genetic contribution to incidence of febrile seizures is manifested by a positive family history and in some cases a history of epilepsy in the family⁽¹⁾. In our study 12 cases(44.4%) had a positive family history of either febrile seizures or epilepsy.

There is controversy regarding the role of iron in febrile seizures. Piscane et al⁽⁴⁾ reported a significantly higher incidence of iron deficiency anemia among patients with febrile seizures in comparison to controls whereas Kobrinsky et al⁽⁵⁾ suggested that anemia raises the threshold of febrile seizures. Daoud et al⁽⁶⁾ have reported significantly lower levels of serum ferritin in children with febrile seizures in comparison to controls. Other parameters of iron deficiency were not significant in the study by Daoud et al⁽⁶⁾. Piscane et al⁽⁴⁾ reported lower levels of HB, MCV and Serum iron in children with febrile seizures in comparison to controls. However Piscane et al⁽⁴⁾ did not measure serum ferritin as a marker of iron deficiency. In our study Serum Ferritin was low in 12 cases(44.4%). Serum Ferritin is a iron storage protein which is in all probability an estimate of iron

stores in the absence of inflammatory disease⁽⁷⁾. As an acute phase reactant serum ferritin should increase with stress, fever being present in 20 of the cases could have caused an increase in serum ferritin levels but the underlying iron deficiency would not have raised the ferritin levels to normal. Low levels of serum ferritin may lower the seizure threshold as iron is important for function of various enzymes and neurotransmitters⁽⁸⁾. Plasma ferritin is an accurate marker for iron deficiency.

Apart from being a cause of anemia, Iron deficiency has many non hematological effects also, the more concerning ones being behavioral disturbances and impaired intellectual and motor functions that occur early in iron deficiency before anemia develops.⁽⁷⁾

Conclusion:

To conclude low serum ferritin levels are seen in children with simple febrile seizures and it play a role in causation of the illness, however larger studies may be needed to arrive at a definitive cause effect relationship.

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Ravi Bhatia conceptualized the study, drafted the manuscript. Gunjan Bhatia did all the lab investigations. Ravi Bhatia will act as the guarantor . The authors declare that they have not received any financial aid.

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