



ASSESSING IRON DEFICIENCY ANEMIA AS A RISK FACTOR FOR CHILDREN WITH FEBRILE SEIZURE

Paediatrics

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ABSTRACT

Background: Febrile seizure is defined as a seizure associated with a febrile illness (>38°C) in the absence of central nervous system infections or acute electrolyte abnormalities in 3-60 months old children without previous afebrile seizures. Iron deficiency (ID), occurs usually between 9-24 months of age and this period coincides with the high incidence of febrile convulsions. The objective of this study is to find the association of IDA with febrile seizure. **Methods:** This is an observational case control study with sample size of 120 patients aged 3-60 months, divided into 2 groups cases (having febrile seizure) and controls (having febrile illness only) having 60 patient each according to the inclusion and exclusion criteria. Data will be collected and sample taken, Hemoglobin, S.ferritin and S.TIBC will be compared between both cases and control for identifying the role of iron in case of febrile seizure. **Result-** Out of 120 patient, Febrile convulsion is more common in age group 13-24 months (36%) Low hemoglobin (76.6%) and high TIBC (21.6%) is observed in cases as compared to control group. Whereas ferritin (28.3%) is on slight lower side in cases as compared to control. **Conclusion-** The present study showed that hemoglobin level is lower in cases i.e child is anemic, but IDA cannot be proved by this study because of conflicting result of S.Ferritin and TIBC level among two groups. Children with febrile seizure are thus suggested for monitoring for diagnosis and treatment of IDA. S.Iron study is advisable.

KEYWORDS

Febrile seizure, Iron deficiency anemia, S. Ferritin

INTRODUCTION

Febrile seizures are among the leading cause of pediatric emergency hospital admission and affect 2% to 5% of pediatric population¹ and are by far the most common type of seizure in childhood. Earlier Indian studies² suggested that up to 10% of children experience a Febrile Seizure, recent data indicate that the incidence rate in India is similar to western figures (5%).³

Iron deficiency (ID), preventable and treatable nutritional deficiency occurs during infancy and childhood, usually between 9-24 months of age and this period coincides with the high incidence of febrile convulsions. Most of the CNS enzymes are iron-dependent for their appropriate function.

Iron deficiency causes dysregulation of normal cellular and organ function. The most obvious result of Iron deficiency is anemia that affects all the organs in the body resulting in cognitive changes and behavioral disturbances, physical growth impairment and immune dysfunction. Neurological symptoms like learning deficits, memory disturbances, delayed motor development, poor attention span and behavioral disturbances caused by iron deficiency are well known. The age range of occurrence of IDA and febrile convulsion is common to both the conditions.

Iron has a significant role in the production, function, metabolism of neurotransmitters, hormonal function, DNA replication and certain enzymes like monoamine oxidase and aldehyde oxides at the cellular level.

Considering the role played by Hemoglobin in carrying oxygen to body tissues such as the brain and the fact that rise in body temperature may exaggerate the symptoms of anemia. Fever can worsen the negative effects of anaemia on the brain and thus trigger seizure attacks. Low ferritin in serum may decrease the seizure threshold.

Prevalence of Anemia according to National Family Health Survey (2019-2021) is 67% in India. Prevalence of anemia is increased by 17.1% from 2015-1016 report. In NFHS (2019-2021) report 79.7% children aged 6-60 months have anemia.

Many studies are present with such conflicting result, so this study is done at our institute for knowing the association between febrile seizure and iron deficiency anemia.

AIMS AND OBJECTIVES

To study the association between iron deficiency anemia in children having febrile convulsion.

To compare the rate of iron deficiency anemia in febrile children with

or without seizure.

METHODOLOGY

This is an observational case control study conducted over a period of 8 months from July 2021 to February 2022 at GGH, Jamnagr. Sample size is 120 patients aged 3-60 months, divided into 2 groups cases (having febrile seizure) and controls (having febrile illness only) having 60 patient each as per inclusion criteria. All information was gathered from parents and indoor case sheet. After initial stabilization, details including Fever (temperature on admission), Seizure detail (type, duration, recurrence, family history) and other complains, were recorded. A detailed history was elicited from parents including demographic data, socioeconomic status, birth history, family history. Routine Sampling to be done, Hb <11mg/dl i.e. having anemia is included in the study. As the child becomes afebrile (for >24 hours), Serum Ferritin (<30µg/dl) and S.TIBC is sent. All data recorded are analysed from SPSS software.

RESULT AND DISCUSSION

In our study, maximum incidence was seen in the age group of 13-24 (36.3%) months. Mean age was 23.54 (SD 14.85) months for cases.

Table:1

Parameters		Case(N-60)	Control(N-60)
Gender	Male	40(66.6%)	34(56.6%)
	Female	20(33.3%)	26(43.3%)
Age group (Months)	3-12	9(15%)	23(38.3%)
	13-24	22(36.3%)	18(30%)
	25-36	15(25%)	11(18.3%)
	37-60	14(23.6%)	8(13.3%)
Family History	Present	24(40%)	9(15%)
	Absent	36(60%)	51(85%)
Cause	RTI	23(38.3%)	24(40%)
	UTI	2(3.3%)	1(1.8%)
	Others*	35(58.2%)	35(58.2%)

*viral fever, enteric fever, brucellosis

In cases group, 66.6% and 33.3% were males and females respectively with male to female ratio of 2:1.

In study conducted by R Biswas et al⁴ 60 % were males and 40 % were females and male to female ratio was 1.5:1

Simple febrile seizures were seen in 70% of cases and complex type was seen in 30%. Study conducted by R Biswas et al⁴ had 90 % simple

FS 10 % had complex FS.

Table:2 Type Of Febrile Seizure

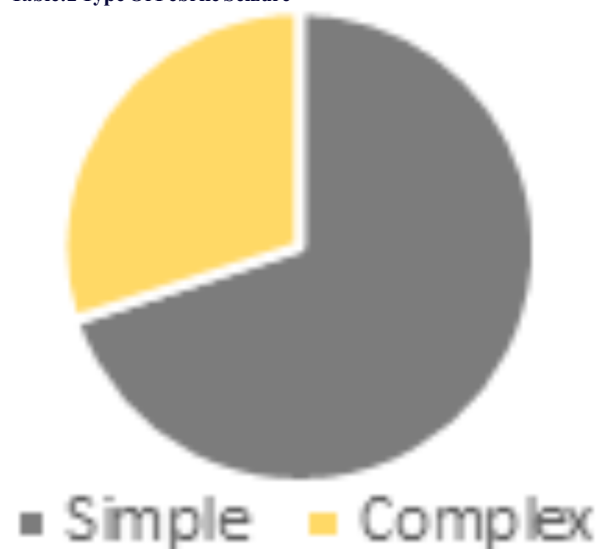


Table 3: Type Of Seizure And Anemia Association

Hb	Simple(N-42)		Complex(N-18)	
<11gm/dl	34	80.9%	12	66.6%
>11gm/dl	8	19%	6	33.3%

In Simple FC cases, 80.9% (mild-57.1%, moderate-23.8%) cases have anemia whereas in Complex FC cases 66.6% (mild-44.4%, moderate-22.2%) have anemia. None of the patients had severe anemia.

Table:4

Investigations		Case(N-60)	Control(N-60)
Hemoglobin (gm/dl)	<11	46(76.6%)	40(66.6%)
	>11	14(23.3%)	20(33.3%)
S.Ferritin(μg/l)	<30	17(28.3%)	20(33.3%)
	>30	43(71.6%)	40(66.6%)
S.TIBC (μg/dl)	<450	50(83.3%)	47(78.3%)
	>450	10(16.6%)	13(21.6%)

Low serum ferritin was noted in 17 cases whereas in control group 20 patient have ferritin on lower side. This finding contradicts with other studies; Pisacane⁴ et al. (Italy, 1996), Hartfield⁸ et al. (Canada) and Vaswani⁶ et al. (India, 2006). The findings of these studies suggest that low serum ferritin level decreases seizure threshold.

TIBC level was slightly higher in control group -13(21.6 %) as against 10(16.6%) in cases group.

Study conducted by Bidabadi⁷ et al., mean TIBC 320.89 with p value 0.002, commenting on association between IDA and febrile seizure.

CONCLUSIONS

Based on the result of this study, iron deficiency could be an important risk factor for development of febrile convulsion. Evaluation of iron status is encouraged to be performed in children with febrile seizure.

When the rate of IDA is high in a particular population(NFHS-69% IDA in 6-60 month children), the difference between the ratio of IDA in FC patients and controls is not high enough to show a significant difference.

In conclusion, children with FSs are suggested to be monitored for diagnosis and treatment of IDA. Furthermore, it is advisable to prescribe iron supplements earlier and more carefully to children who have important and well-known risk factors for febrile convulsion. Further prospective studies are needed to determine whether iron supplementation can prevent the occurrence of febrile seizures.

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