ORIGINAL RESEARCH PAPER

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KEY WORDS: Febrile Seizures, Inflammatory Markers

A STUDY ON HAEMATOLOGICAL PARAMETERS IN FEBRILE SEIZURES

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ABSTRACT

Febrile seizures are the most common neurologic disorder in the pediatric age group, affecting 2–5% of children between 6 months and 5 years of age in the United States and Western Europe with a peak incidence between 12 and 18 months. Although febrile seizure is seen in all ethnic groups, it is more frequently seen in the Asian population (5–10% of Indian children and 6–9% of Japanese children). Systemic inflammatory response has been implicated as a contributor to the onset of febrile seizure [1]. It is studied that IL-B, IL-6, TNF-ALPHA can play an important role in generation of febrile seizure. Although they are the useful biomarkers, its availability in day to day practice is very limited. So there is a need for low cost and widely used inflammatory response markers like NLR, MPV, PLT, and RDW as independent predictors of febrile seizure and to compare different Hematological parameters in febrile seizure in patients with an unclear seizure history.

The 5 novel indices of inflammatory response:

i. Neutrophil Lymphocyte Ratio
ii. Mean Platelet Volume
iii. Platelet Count Ratio
iv. Red cell Distribution Width
v. Serum Ferritin

The study is carried out for the assessment of other hematological parameters in febrile seizures like HB, RBC, PCV, RDW, Platelets, MPV and PCR. Also to compare the variation of hematological parameters in simple and complex febrile seizures based on the laboratory parameters which are otherwise classified clinically.

INTRODUCTION

Fever is induced by pro-inflammatory cytokines such as interleukin (IL)-1β, IL-6, and tumor necrosis factor (TNF)-α during infections3. To date, many studies have suggested that inflammation, which is intrinsic to the fever response, is involved in the generation of FS. These studies suggested that inflammatory cytokines, especially IL-1β, IL-6 and TNF-α can play important role in the generation of FS. Although inflammatory cytokines are useful biomarkers, their increased cost and limited availability are drawbacks [3-9].

So in view of developing low-cost inflammatory response markers like NLR, MPV, PLT, RDW as independent predictors of febrile seizure this study was undertaken.

AIMS & OBECTIVES

1. To study the hematological parameters in Febrile seizure compared to children with fever without seizure.
2. To compare the variation of hematological parameters in Simple and Complex febrile seizures.

Research Methodology

This comparative observational study was conducted in the Department of Pediatrics, from rural tertiary centre from 2020- 2022. All cases of febrile seizures which include both simple febrile and complex febrile seizures between the age group of 6 and 60 months were studied. The control group includes the children in the same age group with fever without focus but without seizures. After informed consent, a detailed history was taken, and the physical examination was done, then the venous blood sample was collected. Serum Ferritin was estimated by the Ferritin-Turbilatex, blanket, CHEMEX, S.A semi autoanalyzer.

Statistical Methods

1. Data will be entered into Microsoft excel data sheet and will be analyzed using SPSS 22 version software.
2. Categorical data will be represented in the form of Frequencies and proportions.
3. Chi-square will be the test of significance.
4. Continuous data will be represented as mean and standard deviation.
5. Independent t test will be the test of significance to identify the mean difference between two groups.
6. p value <0.05 was considered as statistically significant.

Inclusion Criteria

1. Children clinically diagnosed with febrile seizures as per the criteria.
2. Febrile seizures are seizures that occur between the ages of 6 and 60 months with a temperature of 38°C (100.4°F) or higher.
3. Not the result of CNS infection or any metabolic imbalance
4. Occur in the absence of a prior history of afebrile seizures.

Exclusion Criteria

1. Children with medications which can alter haematological parameters
2. Children with congenital heart diseases
3. Children with obvious signs of localized infection.
4. Children with metabolic diseases.
5. Children with chromosomal anomaly.

RESULTS

- Mean WBC among subjects with simple febrile seizures was 12992.93+4841.041which was higher compared to those with complex febrile seizures 12563.18+4703.40.
- Mean HB among subjects with simple febrile seizures was 11.460+2.0820 which was lower compared to those with complex febrile seizures 11.703+1.9457.
- Mean RBC among subjects with simple febrile seizures was 3.3733+.67917 which was higher compared to those with complex febrile seizures, 3.1180+.49213.
- Mean PCV among simple febrile seizures was 33.880+6.2444 among subjects which was similar to those with complex febrile seizures 33.745+5.6937.
- Mean MCV was 77.370+8.4961 among simple febrile seizures which was lower compared to those with complex

febrile seizures, 76.175+7.9581.

- Mean MCH was similar in both the groups.

TABLE 3: COMPARISON OF MEAN HEMATOLOGICAL PARAMETERS BETWEEN THE GROUPS

VARIABLES		GROUP 1	GROUP 2	P VALUE
WBC	MEAN	12778.05	8132.20	0.000*
	SD	4747.342	2025.866	
HB	MEAN	11.581	12.542	0.008*
	SD	2.0059	1.4022	
RBC	MEAN	3.24563	4.09527	0.000*
	SD	.603135	.608958	
PCV	MEAN	33.812	36.130	0.027*
	SD	5.9378	3.8296	
MCV	MEAN	76.773	8.2013	0.000*
	SD	82.028	5.8645	
MCH	MEAN	27.200	28.995	0.126
	SD	7.1834	2.2651	
MCHC	MEAN	32.574	33.753	0.010*
	SD	2.5287	1.8816	
RDW	MEAN	13.463	13.618	0.519
	SD	1.3598	.9419	
PLT	MEAN	3.2392	3.0855	0.399
	SD	.94333	.92827	
MPV	MEAN	8.4860	9.2943	0.000*
	SD	1.17226	1.08740	

GROUP-1: FEBRILE SEIZURES GROUP -2: FEVER WITHOUT FOCUS

- Mean MCHC among simple febrile seizures was 32.937+1.9652 which was similar to those with complex febrile seizures, 32.210+2.9697.
- Mean RDW, and PLT was similar in both the groups. Mean MPV in simple febrile seizures was9.0470+1.01995 which was significantly higher compared to complex febrile seizures, 7.9250+1.04773.

TABLE 7: COMPARISON OF MEAN HEMATOLOGICAL PARAMETERS BETWEEN THE GROUPS

VARIABLES		GROUP 1	GROUP 2	P VALUE
WBC	MEAN	12992.93	12563.18	0.688
	SD	4841.041	4703.403	
HB	MEAN	11.460	11.703	0.592
	SD	2.0820	1.9457	
RBC	MEAN	3.3733	3.1180	0.058
	SD	.67917	.49213	
PCV	MEAN	33.880	33.745	0.920
	SD	6.2444	5.6937	
MCV	MEAN	77.370	76.175	0.518
	SD	8.4961	7.9581	
MCH	MEAN	28.415	25.985	0.131
	SD	9.5905	3.0854	
MCHC	MEAN	32.937	32.210	0.200
	SD	1.9652	2.9697	
RDW	MEAN	13.550	13.375	0.568
	SD	1.3553	1.3758	
PLT	MEAN	3.0365	3.4420	0.054
	SD	94506	90834	
MPV	MEAN	9.0470	7.9250	0.000*
	SD	1.01995	1.04773	

GROUP-1: SIMPLE SEIZURES GROUP -2: COMPLEX SEIZURES

- Mean WBC n among subjects with simple febrile seizures was 12992.93+4841.041which was higher compared to those with complex febrile seizures 12563.18+4703.40.
- Mean HB among subjects with simple febrile seizures was 11.460+2.0820 which was lower compared to those with complex febrile seizures 11.703+1.9457.
- Mean RBC among subjects with simple febrile seizures was 3.3733+.67917which was higher compared to those with complex febrile seizures, 3.1180+.49213.
- Mean PCV among simple febrile seizures was 33.880+6.2444 among subjects which was similar to those with complex febrile seizures 33.745+5.6937.
- Mean MCV was 77.370+8.4961 among simple febrile seizures which was lower compared to those with complex febrile seizures, 76.175+7.9581.
- Mean MCH was similar in both the groups. Mean MCHC among simple febrile seizures was 32.937+1.9652 which was similar to those with complex febrile seizures, 32.210+2.9697.
- Mean RDW,MCH and PLT was similar in both the groups. Mean MPV in simple febrile seizures was9.0470+1.01995 which was significantly higher compared to complex febrile seizures, 7.9250+1.04773.
- Mean NLR was 2.68385+1.793595 in simple febrile seizures which was similar to those with complex febrile seizures, 2.58005+2.048771.
- Mean serum Ferritin was 80.292+45.8281 which was significantly lower compared to complex seizures which were 122.155+97.8737.

CONCLUSION

This study was undertaken to study the haematological parameters in febrile seizures. In this study, we found that haematological parameters like WBC, Hb , RBC, PCV, and MCHC. MCV, MPV, serum Ferritin were significantly associated with febrile seizures and hence we conclude that all these parameters are useful in predicting seizures in febrile children. Parameters like MPV and Serum Ferritin was significantly associated with simple/complex seizures and hence can be used to differentiate simple febrile and complex febrile seizures.

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