

З. Амирреза

**ПОКАЗАТЕЛИ СЕРДЕЧНЫХ ТРОПОНИНОВ И КФК-МВ У ДЕТЕЙ
С ФИБРИЛЬНЫМИ СУДОРОГАМИ**

Научный руководитель: ассист. Е.С. Алексеева

Кафедра поликлинической терапии,

Белорусский государственный медицинский университет, г. Минск

Amirreza Zohoori

**TO EVALUATE THE LEVEL OF CARDIAC TROPONIN I AND
CK-MB IN CHILDREN WITH FEBRILE SEIZURE**

Tutors: assistant A.S. Aliakseyeva

Department of outpatient therapy

Belarusian State Medical University, Minsk

Резюме: Фебрильные судороги наиболее распространенный вид судорог у детей без воздействия на сердечные мышцы. В работе показано, что СК-МВ, являющимся специфичным для сердечных мышц, имеет различия при простых и генерализованных судорогах у детей

Ключевые слова: фибрильные судороги, осложненные фибрильные судороги.

Resume: Febrile seizure is the commonest seizure in children without effect on heart muscles. CK-MB is not specific for cardiac muscles and has difference in SFC and CFC due to probably more skeletal muscles injury in CFC.

Keywords: simple febrile convulsion (SFC), complex febrile convulsion (CFC).

Introduction. It has been shown that epilepsy and seizures can have a profound effect on cardiac function. The Phenomenon of sudden death of epilepsy is closely linked to ictal cardiac changes [1]. Cardiac troponins are specific biochemical markers that are highly sensitive and specific for the diagnosis of acute myocardial Infarction (MI). However, patients with acute neurological illnesses, including rare patients who experienced generalized tonic-clonic (GTC) seizures were found to have elevations in troponin levels [2]. Evidence on troponin elevation after seizures is based on limited data especially in pediatric. Based on previous studies, contradictory results have been reported about elevation of serum levels of cardiac troponin I in patients presenting with sub-acute or acute neurological disorders with or without seizures [3,4]. Prior to the introduction of cardiac troponins, the biochemical marker of choice for the diagnosis of acute MI was the CK-MB isoenzyme. Although CK-MB is more concentrated in the myocardium, it also exists in skeletal muscle and false-positive elevations occur in a number of clinical settings, including trauma, heavy exertion, and myopathy. Febrile seizures are seizures that occur between the age of 6 and 60 months with a temperature of 38C or higher, that are not the result of central nervous system infection or any metabolic imbalance, and that occur in absence of a history of prior afebrile seizures. Febrile seizure can be divided in simple (SFC) and complex (CFC) with their criteria.

Aim: to evaluate the level of cardiac troponin I and CK-MB in children with febrile seizure.

Objective: to study the febrile seizure (simple febrile convulsion and complex febrile convulsion) as the common most seizure in pediatric age group which can cause sudden

death base on increased level serum troponin I and CK-MB due to cardiac damage.

Material and methods. This was a case series study conducted in infants and children between 6month and 6years old, whom were admitted with impression of febrile seizure in pediatric ward of Shahid Motahari hospital, Marvdasht, Fars provenience, Iran, from October 2016 to November 2018. The inclusion criteria were infants and children 6month till 72 month were admitted in pediatric ward as febrile convulsion. The exclusion criteria were patients with diagnosis of meningitis, shigellosis, and pervious neurologic disease with convulsion. According to previous studies and statistical consulting 54 patients need for troponin I, due to $\alpha=0.05$, $SD=0.03$ and $d=0.008$ and 45 patients for CK-MB base on $\alpha=0.05$, $SD=2$ and $d=0.6$, so we selected 54 patients with febrile seizure. Samples contain 3cc clot blood. All samples were taken after 24 hour of convulsion. In laboratory troponin I was checked by Ramp device with immunochromatography method and CK-MB was checked by auto analyzer. The statistical analysis was done using the SPSS version 21. Demographics and other parameters compare with Mann-Whitney U test.

Results and discussion. This study was conducted on 54 subjects with febrile convulsion. With an age range of 6 months to 72 months. 64.81% was male and 35.19% was female. The mean age of the patients was 26.85 ± 16.82 (table.1).

Table 1. Characteristic of the study subjects

Variable		N (%)
Gender	Boys	35(64.81)
	Girls	19(35.19)
Age (month)	Mean \pm SD	26.85 \pm 16.82

The level of troponin I was 0.01 in all subjects. So the mean of troponin I has no difference between male and female and simple and complex febrile convulsion. Therefore, it has no statistically significant difference regarding to gender and type of convulsion according to troponin I. The mean of CK-MB1 serum level was 17.19 ± 13.05 and based on gender was 17.50 ± 14.98 in boys and 16.63 ± 8.96 in girls. The patient's CK-MB1 serum level in SFC and CFC groups has been showed in table 2. The mean of CK-MB1 in patients with SFC is 15.12 ± 10.66 . It is 16.41 ± 12.94 in male and 12.75 ± 3.36 in female. This data shows no statistically difference between boys and girls. ($p=0.65$). The mean of CK-MB1 in patients with CFC is 20.89 ± 16.17 . It is 19.50 ± 18.61 in male and 23.29 ± 11.76 in female. There is no significant statistically difference base on gender in this group. ($p=0.27$). The mean of CK-MB1 in CFC group is 20.89 ± 16.17 and in SFC group is 15.12 ± 10.66 . According to this results there is a significant statistically difference between CFC and SFC in mean of serum level of CK-MB1 is seen ($p=0.03$). Boys are more involved in both SFC and CFC with frequency 65.71% and 63.16% respectively.

Table 2. Serum Creatine kinase-MB1 levels in children with simple and complex febrile convulsion

Indicator	Type of convulsion	Boys	Girls	P-value	Total	
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Creatine kinase-MB1	Simple febrile convulsion (Mean \pm SD)	16.41 \pm 12.94	12.75 \pm 3.36	0.65	15.12 \pm 10.66	0.03
	Complex febrile convulsion (Mean \pm SD)	19.50 \pm 18.6	23.29 \pm 11.76	0.27	20.89 \pm 16.17	

Febrile seizure is the most common seizure in childhoods occurring in 2-7% of children age 6 months and 6 years [5]. In this study, the mean age of patients is 26.85 \pm 16.82 months but in some studies, 23.68 was the approximate estimated age [6,7]. From 54 cases with febrile seizure were included in our study, 35(64.81%) were boys and remainder were girls 19(35.19%), so a definite male predominance was detected for FC in our study. The male/female ratio is 1.84. This result is similar to finding of Habib and et al, in Pakistan in 2003 [8]. The serum level of troponin I was 0.01 in all cases. This value is the lowest normal range of troponin I (0.01-0.2). Therefore, the mean of troponin I has no significant difference in male and female, also between SFC and CFC. These findings represent that cardiac injury do not happen during SFC and CFC. a few studies evaluated troponin levels following seizures using sensitive assays. Most of those studies found that troponin levels remained within the normal range in all patients promoting the conclusion that seizures do not result in troponin level elevation [9, 10]. On the other hand, a few researches show only complicated seizure can cause elevation in troponin level [4,10]. None of these researches didn't include febrile seizure in children. In cases with SFC and CFC we have not significant statistical difference of CK-MB 1 serum level between boys and girls (p=0.65) and (p=0.27) respectively. An interesting finding in our assessment is significant statistically difference of SFC and CFC based on CK-MB1 serum level (p=0.03). The difference of CK-MB1 serum level between SFC and CFC maybe caused by longer time of seizure in CFC than SFC so more skeletal muscles involvement and damaged. According to were mentioned febrile seizure is safe and sudden death in this children is not related to cardiac involvement. But we recommend more study in this field.

Conclusions:

Febrile seizure is the commonest seizure in children without effect on heart muscles. CK-MB is not specific for cardiac muscles and has difference in SFC and CFC due to probably more skeletal muscles injury in CFC.

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