

## TITLE: RANDOM BLOOD GLUCOSE LEVELS IN CHILDREN HAVING FEBRILE SEIZURES

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### Abstract

Febrile seizure (FS) is seizure accompanied by fever without central nervous system (CNS) infection, metabolic or electrolyte disturbances, or a history of afebrile seizure or any acute neurological insult/head trauma in children aged 6 months to 6 years. Fever can occur anytime during or after a seizure and the majority of FS occur within 24 hours of fever onset. <sup>[1]</sup>

Childhood seizure is a traumatic experience for both the child and the parent, and so preventing recurrence is the first goal of therapy. While anticonvulsants are good, they often have adverse effects in children. This makes prevention a major part of management of this condition, part of which involves understanding and correcting the possible causes of the seizure such as glucose and electrolyte imbalances in the affected children. <sup>[2]</sup>

Aim of the study was to assess the random blood glucose levels in children presenting with FS. This descriptive, cross-sectional study involved the assessment of random blood glucose levels in 18 children aged 6 months- 6 years, admitted at Rajindra Hospital, Patiala, between July 2014-August 2015 for the treatment of febrile seizures. We found that 17 children had random blood glucose levels in the euglycemic range and 1 child had hyperglycemia. Hence, it was concluded that random blood glucose value disturbance was not significant in the patients with FS.

**Keywords:** Random Blood, Glucose, Febrile Seizures.

### ABBREVIATIONS

FS – Febrile Seizure, CNS- Central Nervous System, CSF – Cerebrospinal Fluid, CT – Computed Tomography, MRI – Magnetic Resonance Imaging.

### Introduction

FS is seizure accompanied by fever without CNS infection, metabolic or electrolyte disturbances, or a history of afebrile seizure or any acute neurological insult/head trauma in children aged 6 months to 6 years. Fever can occur anytime during or *after* a seizure and the majority of FSs occur within 24 hours of fever onset. <sup>[1]</sup> Childhood seizure is a traumatic experience for both the child and the parent, and so preventing recurrence is the first goal of therapy. While anticonvulsants are good, they often have

adverse effects in children. This makes prevention a major part of management of this condition, part of which involves understanding and correcting the possible causes of the seizure such as glucose and electrolyte imbalances in the affected children. <sup>[2]</sup>

Stressful conditions such as seizures are associated with temporary hyperglycemia due to elevated cortisol, glucagon, growth hormone and other cytokines. <sup>[3]</sup> Studies have shown that children with complex febrile seizures and prolonged seizures tend to experience prolonged and severe hyperglycemia. <sup>[4]</sup> During prolonged seizures, there is a sustained rise in metabolism in response to aberrant, and continuous neuronal discharges, hence inducing anaerobic glycolysis and causing poor glucose metabolism. <sup>[3]</sup> Hyperglycemia in cerebrospinal fluid is consistently observed in children with FS. <sup>[5]</sup> These ions are directly responsible for maintaining the voltage gradient across neuronal and glial membranes and glucose supplies the energy required for efficient neuronal activity, hence must be maintained constant. <sup>[2]</sup>

### **Aims and Objectives**

To assess the random blood sugar levels in children having FS.

### **Materials and Methods**

#### **A. Study Design**

Descriptive, cross-sectional study.

#### **B. Study setting**

Rajindra Hospital, Patiala, Punjab, which is a tertiary-care hospital.

#### **C. Study Duration**

July 2014-August 2015.

#### **D. Study Group**

Children aged 6 months-6 years hospitalized for FS.

#### **E. Sample Size**

17 children.

#### **F. Inclusion Criteria**

Children aged 6 months-6 years hospitalised for FS.

#### **G. Exclusion Criteria**

Children less than 6 months age.

Children more than 6 years age.

Children with CNS infections.

Children with diabetes mellitus.

Children with abnormal CT/MRI/EEG findings.

Children with neurodevelopmental disorders.

Children with metabolic syndromes.

Children with hypoglycaemia.

#### **H. Definitions**

Hypoglycemia-Random blood glucose less than 70 mg/dL. <sup>[6,7]</sup>

Hyperglycemia-Random blood glucose more than 126 mg/dL. <sup>[8]</sup>

### I. Sampling Technique

All the patients fulfilling the exclusion and inclusion criteria were involved in the study.

### J. Data Collection

Data was collected in a retrospective manner. Blood glucose levels done on admission to the hospital were recorded.

### K. Limitations of Study

Small sample size.

As it was a retrospective study, serial measurements of blood glucose were not available.

Also, the time gap between the FS episode and drawing of blood sample was not known.

Duration of the seizure episode was not known.

### Results

Out of the 18 children, 14 (77.8%) were males and 4 (22.2%) were females. Random blood glucose of 17 (94.4%) children was normal. Only 1 (5.6%) child had hyperglycemia.

### Discussion

Based on gender distribution, FS was more common in males (77.8%) than in females (22.2%), similar to a study by Habib et al., which showed that male children were 1.3 times more likely to develop febrile seizures than females.<sup>[9]</sup> Mahyar et al. also showed that gender played an important role in the occurrence of FS.<sup>[10]</sup> Similar findings were present in a study conducted by Mohamed et al.<sup>[2]</sup> The gender disparity can be explained by the observation that male children tend to be more susceptible to infections and frequent illness and thus may have a greater risk of febrile convulsion recurrences.<sup>[11]</sup>

Multiple studies also found that children with FS had significantly higher serum glucose levels than those with fever but without seizures.<sup>[2,5]</sup> In our study, most of the children were euglycemic (94.4%). Only 1 child had hyperglycemia (5.6%). These findings resembled a study by Monica et al, which showed euglycemia in 84% cases and hyperglycemia in 6% of children with FS.<sup>[12]</sup>

### Conclusion

FS was more common in males. There was no significant correlation of random blood glucose level abnormalities with FS. Hence, we conclude that more studies are required to establish if there is a real correlation of FS with random blood glucose level abnormalities, or if there is a correlation between random blood glucose levels and the time since the first episode of FS.

### Conflict of Interest

There was no conflict of interest among the authors.

### Funding

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