

Routine Laboratory Investigations in Children Presenting with Febrile Seizures

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ABSTRACT

Objectives: Present study was conducted to investigate the value of routine laboratory investigations in children presenting with fever and seizures.

Materials and Methods: All children aged between 3 months to 5 years presenting with febrile seizures during study period from april 2015 to march 2016 who were admitted to the Department of Pediatrics, Santosh Medical College, Ghaziabad, UP, India were evaluated. The demographic and clinical data was collected such as age, gender, type of the febrile convulsion (Simple or complex), duration of seizure, rectal temperature, family history of seizures and epilepsy, past history of the febrile seizures, aetiology of fever, signs and symptoms of meningitis, gestational age at birth, clinical and laboratory reports.

Results: 57 children had episodes of febrile seizures. The mean age of patients in our study was 24.3 ± 15.9 months. The highest frequency of febrile seizures was seen in the 1-2 years' age group, which included 29 cases (50.9%). In contrast, the lowest frequency belonged to the age group of 4-5 years' (4 cases). Family history of febrile seizures and epilepsy was found in 15 cases (26.3%) and 5 cases (7.02%) respectively. In our study 48 (84.2%) patients presented with generalized seizures and 9 (15.8%) had focal seizures. The febrile seizures were simple in 38 (66.7%) and complex in 19 (33.3%) cases. Acute gastroenteritis (28.1%) was the most common cause of febrile illness.

INTRODUCTION

Febrile seizure (FS) is defined as a seizure event in infancy or childhood, usually occurring between 3 months to 5 years of age, associated with fever but without evidence of intracranial infection or other definable cause.¹ FS are one of the most common types of seizures occurring in childhood from which 2-5 percent of children suffer.²

Usually is divided into two types:

1. Simple
2. Complex.

Simple convulsion usually takes less than 10-15 minutes, generalized tonic clonic, tonic, clonic or atonic. Complex FC has one or more of the following features: a focal onset or showing focal deficit during convulsion attack, duration longer than 15 minutes. During the first 24 hours, it occurs more than once.

Despite its benign nature, the febrile convulsion is one of the most common reasons for admission to Paediatric ICU worldwide. The

Conclusions: Febrile seizure is a common benign disorder of childhood and often resolves spontaneously without any sequel. Therefore, parental education, counselling and reassurance are the cornerstone of management and follow-up. The routine performance of laboratory investigations in children presenting with fever and seizures is of low yield. These investigations should be individualized on case to case basis and should be based on the clinical presentation.


Keywords: Epilepsy, Febrile, Laboratory Investigations, Seizures.

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fever associated with febrile convulsions is most often caused by upper respiratory tract infections, gastroenteritis and urinary tract infections.^{1,3} In India; the incidence of febrile seizures is 5-10%. The average recurrence rate after a first febrile seizure is 30-40%, but this is dependent on complex interplay between the genetic and environmental factors. Numerous conducted studies have noted hazardous factors for its recurrence for infants less than 15 months old including fever background, convulsion history in first degree relatives, complex convulsion and looking after in daily care units.^{4,5} Kong CK and Ko CH revealed that the history of seizures among first degree relatives was the only substantial risk factor for seizure recurrence.⁶

Every 5-10 years, the value and need for various investigations or treatment has been revisited in the medical press. However, despite the commonness of this clinical problem, consensus over management remains elusive.

AIMS & OBJECTIVES

Therefore, present study was conducted to investigate the value of routine laboratory investigations in children presenting with fever and seizures.

MATERIALS AND METHODS

For present study, all children aged between 3 months to 5 years presenting with febrile seizures who were admitted to the Department of Pediatrics, Santosh Medical College, Ghaziabad, UP, India were evaluated. A written informed consent of parent was obtained from parents of all participants of this study. The demographic and clinical data was collected such as age, gender, type of the febrile convulsion (Simple or complex), duration of seizure, rectal temperature, family history of seizures and epilepsy, past history of the febrile seizures, aetiology of fever, signs and symptoms of meningitis, gestational age at birth, clinical and laboratory reports. Patients with a past history of unprovoked convulsion, metabolic disorders, known illnesses of central nervous system and neurological deficits were excluded from this study. Anaemia is defined as haemoglobin levels less than 11 g/dL for age group 6-72 months. Abnormal cerebrospinal fluid analysis included one or more of the following features: Positive gram stain, more than 5 white blood cells and low glucose content of cerebrospinal fluid or increased CSF protein.⁷

Table 1: Laboratory finding in present study

Lab Parameters	Results
Anaemia	40 (70.2%)
Leucocytosis	16 (28.1%)
Leukopenia	1 (1.8%)
Thrombocytosis	2 (3.5%)
Thrombocytopenia	2 (3.5%)
Hypernatremia	3 (5.3%)
Hyponatremia	5 (8.8%)
Hyperglycaemia	1 (1.8%)
Hypoglycaemia	4 (7.0%)
Hyperkalemia	5 (8.8%)
Hypokalemia	1 (1.8%)

Table 2: Underlying etiology of febrile seizures

Focus of Infection	Results
AGE	(16) 28.1%
URTI	(9) 15.8%
LRTI	(7) 12.3%
UTI	(7) 12.3%
ASOM	(4) 7.0%
ABSCESS	(4) 7.0%
MENINGITIS	(3) 5.3%
NO SOURCE	(7) 12.3%

RESULTS

57 children had episodes of febrile seizures admitted in department of Pediatrics, Santosh Medical College, Ghaziabad, UP, India during study period from april 2015 to march 2016. The mean age of patients in our study was 24.3±15.9 months.

The highest frequency of febrile seizures was seen in the 1-2 years' age group, which included 29 cases (50.9%). In contrast, the lowest frequency belonged to the age group of 4-5 years' (4 cases). Family history of febrile seizures and epilepsy was found

in 15 cases (26.3%) and 5 cases (7.02%) respectively. The mean rectal temperature at time of admission was 38.8°C. In our study 48 (84.2%) patients presented with generalized seizures and 9 (15.8%) had focal seizures. The febrile seizures were simple in 38 (66.7%) and complex in 19 (33.3%) cases. The majority of our patients (68.4%) had seizure durations less than or equal to 15 minutes. CSF study was done in 20 patients (35.1%). Among patients who underwent lumbar puncture, 3 patients had abnormal findings in CSF analysis in favour of meningitis. Acute gastroenteritis (28.1%) was the most common cause of febrile illness.(Table 1,2)

DISCUSSION

Although childhood febrile seizures in most cases are benign and self-limiting, witnessing such seizures is a terrifying experience for most parents and families. Febrile seizures are the most common form of childhood seizures, affecting approximately 2-5% of children and usually occurs between 3 months and 5 years, with a peak incidence at 18 months. The onset of FS in a child older than 6 years is Unusual.^{1,2,8} Fortunately, most febrile seizures are benign and rarely cause brain damage.⁹ Although febrile seizures are benign in nature, they lead to fear and anxiety among parents and subsequently it affects the family's quality of life. Physical, psychological and behavioural disorders may manifest due to the lack of sufficient knowledge of parents about febrile seizures. The highest frequency of febrile seizures was seen in the 1-2 years' age group, which included 29 cases (50.9%). In contrast, the lowest frequency belonged to the age group of 3-4 years (4 cases). Results were comparable to studies done by Koppad AM et al and Miri Aliabad G et al.^{7,10} In our study, 15 cases (26.3%) had a positive family history of febrile seizures. This finding was similar to previous studies which stated that it varies from 25% to 40%.^{7,10} In present study, 5 cases (7.02%) had a positive family history of epilepsy, while this frequency varied from 1.6% to 9% in other studies.^{8,11} In the present study, 48 (84.2%) patients had generalized seizure that is similar to the other studies. In our study, 38 (66.7%) were suffering from simple febrile seizure, while this was between 60 to 90 percent in other studies.¹¹⁻¹³

Al-Khathlan NA & Jan MM found that in 4 percent of cases of FS, signs and symptoms of meningitis were seen and in 35 percent of cases no reason was specified for fever.¹⁴ Al-Zwaini EJ Stated that upper and lower respiratory tract infections were the causes of febrile illness in 67 percent of patients,¹³ while in the our study 28.1% of patients had febrile illnesses due to acute gastroenteritis, 15.8% of cases had Upper Respiratory Tract Infection (URTI) and 12.3% cases had Lower Respiratory Tract Infection (LRTI), 12.3% had fever due to urinary tract infection and 5.3% of all cases had fever caused by meningitis and in 12.3% of cases no cause was found.

CSF analysis should be considered in patients of upto 2 years of age as symptoms and signs of meningitis may be subtle. Symptoms and signs of meningitis may also be masked in children with febrile seizures who have received antibiotics; hence CSF analysis is essential in cases of febrile seizures.⁷ The American Academy of Paediatrics also recommends CSF analysis in patients under 12 months of age presenting with fever and seizure, because signs of meningeal irritation may be minimal or absent in this age group.¹⁵ Few electrolyte abnormalities were found in our study among FS patients, so it is recommended not

to be done in all cases. Routine laboratory studies in patients with simple febrile seizures are discouraged by other authors also.^{7,16} There is no evidence that simple febrile seizures cause any structural damage to the brain or that children with simple febrile seizures are at risk for cognitive decline. Population based studies have shown that febrile seizures in early childhood do not have adverse effects on behaviour, scholastic performance and neurocognitive attention.¹⁷

The findings of this study are therefore congruent with the 1996 recommendation of the American Academy of Paediatrics. The routine performance of laboratory investigations in children presenting with fever and seizures is of low yield. The performance of lumbar punctures and bacterial cultures in children with fever and seizures should be individualized and based on the clinical presentation. Considering the financial burden and physical discomfort experienced by the child and family, and the cost in terms of time, manpower and resources of biochemical and haematological evaluations in children presenting with fever and seizure which are of low yield, the 1996 AAP recommendations that serum electrolytes, calcium, phosphate, magnesium, complete blood count and blood glucose be not performed routinely in a child with a first simple febrile seizure can therefore be safely applied to this study population.¹⁵

CONCLUSION

Febrile seizure is a common benign disorder of childhood and often resolves spontaneously without any sequel. Therefore, parental education, counselling and reassurance are the cornerstone of management and follow-up. The routine performance of laboratory investigations in children presenting with fever and seizures is of low yield. These investigations should be individualized on case to case basis and should be based on the clinical presentation.

REFERENCES

1. Aicardi J. In *Epilepsy in Children* 2nd Edition (The International Review of Child Neurology) 1994; p 255.
2. Alexander KC, Leung W, Lane M Robson. Febrile seizures. *J Paediatr Health Care* 2007;21(4):250-5.
3. Noah PK, Archer EY. Routine investigations in first febrile seizures. *West Indian Med J* 1987; 36: 236-40.
4. Knudsen FU. Recurrence risk after first febrile seizure and effect for short term diazepam prophylaxis. *Arch Dis Child* 1985;60(11):1045-9.
5. Chan KK, Cherk SWW, Chan CH, et al. A retrospective review of first febrile convulsion and its risk factors for recurrence in Hong Kong children. *HK J Paediatr (new series)* 2007;12(3):181-7.

6. Kong CK, Ko CH. Local data on febrile convulsion. *HKCNDP education bulletin* 2000;1:6-8.
7. Koppad AM, Karanjkar M, Dagar J, et al. Assessment of laboratory investigations in simple febrile seizures in a tertiary centre. *J. Evolution Med. Dent. Sci.* 2016;5(45):2825-2827, DOI: 10.14260/jemds/2016/660
8. Waruiru C, Appleton R (2004) Febrile seizures: an update. *Arch Dis Child* 89:751-756.
9. Pedespan L. Febrile seizures. *Arch Paediatr* 2007;14(4):394-8.
10. Miri Aliabad G, Khajeh A, Fayyazi A, et al. Clinical, epidemiological and laboratory characteristics of patients with febrile convulsion. *J Compr Ped* 2013;4(3):134-7.
11. Sfaifi L, Maaloul I, Kmiha S, et al. Febrile seizures: an epidemiological and outcome study of 482 cases. *Childs Nerv Syst* 2012;28(10):1779-84.
12. Fallah R, Golestan M. Role of laboratory diagnostic tests in first febrile seizure. *J Paediatr Neurol* 2008;6(2):129-32.
13. Al-Zwaini EJ. Epidemiological and clinical features of hospitalized patients with febrile seizures in Ramadi, west of Iraq. *J Paediatr Neurol* 2007;5(4):311-5.
14. Al-Khathlan NA, Jan MM. Clinical profile of admitted children with febrile seizures. *Neurosciences (Riyadh)* 2005;10(1):30-3.
15. American Academy of Paediatrics Practice parameter. The neurodiagnostic evaluation of the child with a first simple febrile seizure. American academy of paediatrics. Provisional committee on quality improvement, sub-committee on febrile seizures. *Paediatrics* 1996;97:769-75.
16. Hampers LC, Spina LA. Evaluation and management of paediatric febrile seizures in the emergency department. *Emerg Med Clin North Am* 2011;29(1):83-93.
17. Verity CM, Greenwood R, Golding J. Long term intellectual and behavioural outcomes of children with febrile convulsions. *N Engl J Med* 1998;338:1723-5.

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