

# RESEARCH ARTICLE

## IS LUMBAR PUNCTURE ALWAYS NECESSARY IN THE FEBRILE CHILD WITH CONVULSION?

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### Abstract:

#### Objective

Febrile convulsion is the most common benign convulsive disorder in children. Meningitis is one of the most important causes of fever and convulsions, diagnosed by lumbar puncture (LP), a painful and invasive procedure much debated regarding its necessity. This study evaluates the frequency of abnormal LP findings in a group of patients, to determine whether or not unnecessary LP can be prevented without missing patients with serious problems such as meningitis.

#### Materials & Methods

The study was a descriptive, cross sectional study, conducted on 200 children suffering from fever and convulsions. Medical files of patients were taken from the hospital records and relevant data were collected to complete the appropriate forms.

#### Results

Of 200 patients included in the study, 116 (58%) children were male, and 84 (42%) were female. 47 cases (23.5%) underwent LP, of whom just one (0.5%) had abnormal LP and meningitis.

#### Conclusion

Regarding Considering the low prevalence of meningitis in children with convulsion and fever, we conclude that by means of precise clinical examination and monitoring, it is possible to prevent unnecessary LP in these patients.

**Key Words:** Fever and convulsion, Lumbar puncture, Meningitis.

### Introduction

Management of convulsion accompanied with fever is a controversial issue. During the first years of life, 3 to 4 percent of infants are affected by fever with convulsion (1). Literature shows that children who have had one or more episodes of fever and convulsion as compared to children, who have not, are more likely to be affected by epilepsy (2); also febrile convulsion can lead to status epilepticus which has many complications. Hence pediatricians are almost daily faced with such patients and the related problems, such as diagnosis, treatment, prevention, type of drug, duration of therapy and outcomes, and the effects on child's mental abilities. It follows that quite naturally the exact diagnosis and etiology of the condition is of high importance (3).

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Bacterial meningitis is a convulsive disease, the misdiagnosis of which leads to serious untreatable brain disabilities or death. Febrile convulsion (FC) is the most common convulsive disorder in children aged between 6 months to 5 years, in the absence of any CNS infections, meningitis, encephalitis, severe electrolyte imbalance, heat stroke and acute neurological injuries (4). To rule out these disorders and confirm FC, diverse clinical evaluations and paraclinical tests are necessary (4). While LP is an important procedure used to differentiate between them, it is an invasive, painful and sometimes dangerous test which could be probably avoided in unnecessary situations.

**Materials & Methods**

This was a cross sectional, descriptive study conducted on febrile children hospitalized for convulsion with fever in the Amir-cola children hospital between July and December 2003. Data was collected from records of children hospitalized for fever and convulsion in the emergency ward. Two hundred files were selected and the data required for each child was entered in specific questionnaires. Studied parameters were: age, sex, and body temperature; type of convulsion, duration of

convulsion, time of convulsion in the current febrile episode, history of FC in the child, history of FC in the family, using drugs, mental status and analysis of CSF fluid were also obtained. All statistical analyses were done using SPSS statistical software. In our study, a temperature as of 37.8 C° (rectal) was considered as fever. Simple FC was defined as a convulsion of less than 15 minutes, without focal symptoms, just one occurrence per 24 hours, otherwise complex FC was implied. Familial history of convulsion in the first and second relatives was taken into consideration.

According to the recommendations of American Academy of Pediatrics (AAP) on doing LP in patients with febrile convulsion, the procedure was done for our patients (5). This recommendation is shown in table 1.

**Results**

Of the 200 patients, 47 cases (23.5%) had undergone LP according to AAP recommendations; among these, 26 (55.31%) were boys and 21 (44.68%) were girls. Overall 164 children (82%) had simple FC and 36 (18%) had complex FC. The findings have been presented in table2.

**Table1.** The recommendation of AAP on doing LP in patients with FC

	Sometimes	Usually	Always
lumbar puncture	>18 months	12-18 months	<12 months

**Table 2.** Frequency of LP in the children with febrile convulsion

LP	Simple FC(%)	Complex FC (%)	Total (%)
Done	36(21.95)	11(30.55)	47(23.5)
Undone	128(78.04)	25(69.44)	153(76.5)
Total	164(82)	36(18)	200(100)

None of the 164 patients with simple febrile convulsions had meningitis; one child of 36 with complex febrile convulsions showed abnormal findings in LP analysis. Among the children studied, in 63.02% , convulsions lasting less then 5 minutes were seen; 5 to 15 minute convulsions were seen in 27.63% and 7.53% of them had

convulsions of more them 15 minutes. History of familial convulsion was positive in 36.68% of children with FC. Among the children, 33.16% had previously convulsions. 20 cases of complex F.C. had over 2 episodes or more in 24 hours and one child had both risk factors.

Table 3: Frequency of children who underwent L.P, according to their ages and sex

Age-groups (months)	Boy (%)	Girl (%)
6-12	10(21.27)	9(19.14)
13-24	7(14.89)	6(12.76)
25-36	3(6.38)	4(7.49)
37-48	2(4.25)	1(2.12)*
49-60	4(8.51)	1(2.12)
Total	26(55.31)	21(44.69)

\*This girl had abnormal CSF.

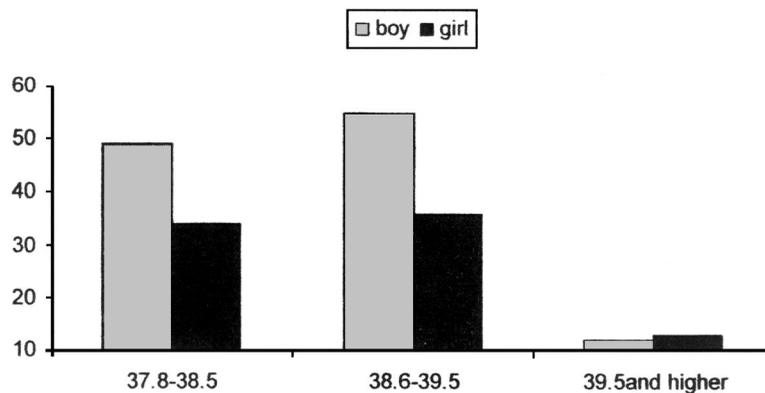


Figure: Frequency of fever in patients (centigrade via rectal route )

### Discussion

Of the 200 febrile children, hospitalized for convulsion, 23.5 percent underwent LPs, and of these just one had showed abnormal LP and meningitis. Considering the low frequency of abnormal LP in patients with convulsion and fever, it is concluded that there is a high frequency of unnecessary LP in these patients.

In 1996, the American Academy of Pediatrics (4), and in 1991, some pediatricians of the British society of children, (5) developed guidelines for performing an LP for the neurological evaluation of 6 mo-5 yr old children with FC; those guidelines recommended LP in all children aged below 12 months, and monitoring of 12 to 18 month old children for hidden symptoms of meningitis. According to the recommendations, LP in children more than 18 months old in absence of clinical suspicions was considered unnecessary (6).

LP needs to be done more carefully; the procedure is invasive and not much favored by parents or children. Various related studies assessing complaints and clinical examinations, found doing LP as a routine was unnecessary (7), while some thought it to be necessary for prevention of the complications of meningitis (1). Undoubtedly as compared to twenty years ago, there has been a reduced tendency to do the procedure in many countries.

According to one study in England, in 1970, 96% of children with the first FC had undergone LP, whereas this rate decreased to 67% in 1980 and to 16% in 1990 (8).

Recent evidence shows that considering meningitis in children with convulsion and fever in the absence of other symptoms is now questionable; two other points in these new findings, are first, the prevalence of bacterial meningitis as a cause of convulsion plus fever is rare with an overall incidence of 0.8% and second, in the last few years, there has been a drop in the prevalence of meningitis, and a consequent decline by to 0.23% in 1990. More studies by experts reveal that the incidence of meningitis, in the absence of other related symptoms is rare, as in one study only 4 of 30 patients with meningitis showed no other symptoms whereas in 3 other cases, the absence or presence of symptoms was not evaluated. In this study of the 7 patients who underwent LP, 3 cases were normal and LP was repeated for them when the patient's condition worsened. The results

confirmed pneumococcal meningitis in one and meningococcal meningitis in the other two. One of them died due to delayed administration of antibiotics. Although the age of two patients was undefined but 4 of them were over 1 year old while and one patient was below that age (9). In one study, patients with meningococcal meningitis, at the time of hospitalization, had up to 8% normal CSF results; of course most of these children had meningitis symptoms and septicemia (such as skin rash) (10). Rutten and his colleagues in their two year study of children with convulsion and fever, just 4 children, out of 328 who underwent LP, had meningitis and one of them had bacterial meningitis. Of these children, two had primary normal LPs which 48 hours later were diagnosed as meningococcal meningitis (11). In another study conducted by Green et al examined 20-year records of 503 cases of meningitis in children aged 2 mo-5yrs, of two hospitals. Of these, 115 cases (23%) had meningitis plus convulsion. From this group, 105 children had consciousness levels of obtundation or coma. The 10 remaining children in spite of acceptable levels of consciousness, showed indications for lumbar puncture, such as nuchal rigidity, long time focal convulsion, frequent convulsions, skin rash and forceful evidence implied meningitis (6, 9), suggesting indications of LP in 6 year-old febrile convulsive children who are admitted with convulsion, skin rash, cyanosis, hypertension, respiratory distress, and abnormal neurological findings on examination; here the single symptom suspected for meningitis was convulsions. Other studies have also reported prevalence of meningitis in less than 1% of patients with convulsion plus fever (12-14). Again a study in Chicago revealed the rates of serious bacterial illness in first simple febrile seizure were low and consistent with febrile children without seizures (15).

According to results shown in table 3, there is partial advantage in favor of doing LP in patients with complex F.C rather than simple ones. In our study, there was just a sickly 3.5 year old girl with abnormal LP who had also presented with other symptoms of meningitis, including meningeal irritation and frequent prolonged convulsions.

### Conclusion

To conclude, considering the complications such as the possibility of dangerous outcomes of LP in children, if

the child does not have any signs indicating meningitis (such as neck rigidity, Kerning's sign, Brudzinski's sign, decrease in consciousness level, headache, irritability, nausea, vomiting), physicians could prevent unnecessary LPs from being performed by monitoring the patients regular examination in the early stages, except when other signs of meningitis are seen. Further studies to confirm these results are strongly recommended; the precise criteria for carrying out an LP must be clarified, so that any potential case of meningitis may not be missed.

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