Febrile Seizures: Clinical Course and Diagnostic Evaluation

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Farideh Shiva,Hameed Raza Hashemian (Department of Pediatrics, Taleghani Hospital, Shaheed Beheshti University of Medical Sciences, Tehran, Iran.)

Abstract

A study was done on 111 children admitted in a university hospital in Tehran with fever and seizures to document the pattern of illness and to define indications for performing a lumbar puncture in children with fever and convulsions. Bacterial meningitis was diagnosed in 4 patients, aseptic meningitis in 2 and 105 children had febrile seizures. The cause of fever was gastro-enteritis in 39 patients and upper respiratory tract infection with or without Otitis media in 40. Although most patients were drowsy on admission (n=93), none had any signs of meningeal irritation, except one child with slight nuchal rigidity. Out of the 4 children with bacterial meningitis, 3 had meningeal signs, but in one 10 month old baby with no signs, the diagnosis was made on the cerebro-spinal fluid findings after a lumbar puncture. These results support the view that a lumbar puncture should be performed on all infants under 12 months who present with fever and convulsions and strongly considered between 12 and 18 months. After 18 months a lumbar puncture is mandatory in the presence of signs of meningeal irritation (JPMA 48:276, 1998).

Introduction

Febrile seizures, occurring in2-5% of children, make up the most common convulsive event in childhood. Simple febrile seizures are generalized seizures, lasting less than 15 minutes and not recurring within 24 hours[1-3]. Bacterial meningitis, however, may also present with fever and convulsions and the signs of meningeal irritation may be lacking in a young infant[1,2]. Lumbar puncture is the only definitive diagnostic test to mie out meningitis and until very recently it,used to be standard practice to perform a spinal tap on every child with a first febrile seizure. Since the lumbar puncture is an invasive procedure, unpleasant and at times, unacceptable to the child and his/her parents and in most cases the cerebro-spinal fluid turns out to be normal, there has been a revision of opinion regarding indications for a spinal tap in a febrile, convulsing young child. In this study 111 patients who presented with fever and convulsions were reviewed to document their clinical course and to define indications for a lumbar puncture.

Patients and Methods

The case notes of 111 patients who presented with fever and convulsins to the pediatric department of a university hospital in Tehran were evaluated. One hundred and five patients bad been discharged from the hospital with a diagnosis of Febrile seizures, 4 were treated for Bacterial Meningitis and 2 patients diagnosed as having Aseptic Meningitis. Meningitis was diagnosed on the results of a Lumbar Puncture. In 3 patients with bacterial meningitis, in addition to the cellularand biochemical changes, the culture of the cerebro-spinal fluid was positive for peumococcus in the patient witha negative culture, the cerebrospinal fluid showed pleocytosis with polymoiphonuclear predominance and a rise in protein and a decline in the sugar content, (<50% of the blood sugar). The cerebro-spinal fluid findings on 85 patients with febrile seizures on whom a spinal tap was done were normal. On 25 children with febrile convulsions a lumbar puncture had not been done as these children had a previous history of febrile seizures and had no meningeal signs.

Since most chidren with febrile seizures had experienced the seizure at home, the type and duration of the seizure had been recorded at home by the parents except in children who had prolonged seizures and were still convulsing when they reached the hospital.

Results

Out of 105 children with Febrile Seizures, 53 were girls and 52 boys. Seventy seven patients were admitted with their first seizure and 28 with a recurrent seizure. All children had experienced their first episode between 6 months and 5 years of age, except 1 baby who was 5 months old. Most children (n=90), had a fever of >38°C at the time of admission. Cause of fever was identified as an upper respiratory tract infection, with or without Otitis media in 40 children and as diarrhea in 39. No cause of fever was found in 17 cases. While UTI, varicella and pneumonia were found in others.
All convulsions were generalized and most (n84), lasted <15 minutes. In 12 children the duration of the seizure was not recorded.
Three children with febrile seizures complained of headache, 53 had been vomitting and most (n=93) were drowsy on admission. None of the 105 patients had signs of meningeal irritation, except one 12 - month old with slight neck rigidity (Table).

Table. Clinical manifestations - Febrile seizures and meningitis.

	Febrile seizure (n=105)	Meningitis (n=4)
Drowsiness	93	4
Neck rigidity	1	3
Kernig's sign	0	3
Brudzinski's sign	0	3

Out of the 4 children with bacterial meningitis, 3 had meningeal signs and were clinically diagnosed as having meningitis. One 10-month old baby lacked classical memngeal signs and the diagnosis of meningitis was made on the cerebro-spinal fluid findings after a lumbar puncture.

Discussion

All 105 children, who were included in the study, experienced their first episode of a febrile convulsion before their fifth birthday, withapeak in incidence in the 2ndyearand a sharp decline after 3 years of age. These findings are similar to other workers[1-4]. In Farwell's study on 910 patients, 64% experienced their 1st episode in the 2nd year of life[3]. Plochi reports a mean age of 22.9 months at the time of the firstfebnle seizure[4]. In our study the incidence in girls and boys was similar, although most studies report febrile convulsions to be more common in males[3-5].
The degree of fever at the time of the seizure was between 38°C and 41°C in 90 patients; most children in whom the temperature was below 38°C had received antipyretic medication and or cold sponging before the temperature was recorded. The pathophysiologic events leading to a febrile seizure are not

clear; the role of Arginine Vasopressin and lack of increase in cerebrospinal fluid histamine has been studied, with conflicting results[2,6]. Previously it was thought that the seizure was associated with a rapid rise in temperature, but recent evidence suggests that the final height of temperature is more significant than the rate at which the temperature rises[7].

In most of our cases the cause of fever was an upper respimtoiy tract infection with or without acute otitis media and gastmenteritis. In Farwell's study, 32% had otitis media, 12% upper respiratory tract infection while in 27% the cause of fever was not diagnosed and only 1% of patients had gastroententis3. Lee reported upperrespiratory tract infection and otitis media as the two most common causes of fever and 7% of his patients with febrile seizures had urinaiy tract infeciton[5].

In the management of these children, the most important consideration is to rule out meningitis as the cause of fever[1,2,8]. In the present study,4 out of 111 children who presented with fever and convulsions had bacterial meningitis. Previous studies show asimilarincidence of 3-4%[9-11]. Out of the 4 patients with bacterial meningitis, one 10 month old baby lacked classical memngeal signs and the diagnosis of meningitis was made only on the basis of the cerebro-spinal fluid findings.

Literature search reveals existance of great controversy regarding indications for a lumbar puncture in these chidlren[1,8,10-12]. Akpede's data in Nigeria reveals a 4.2% incidence of bacterial meningitis and lists young age and a focal first seizure as risk factors for the presence of meningitis[9]. In approximately 13-16% of children with meningitis, seizures are the presenting feature of the disease and in 30-35% of these patients, especially those under 18 months, rnemngeal signs may be lacking. The American Academy of Pediatrics has developed a Practice Parameter regarding neurodiagnostic evaluation of children with a first simple febrile seizure[1]. The Academy recommends that a lumbar puncture should be strongly considered in an infant younger than 12 months with a first simple seizure with fever and should be considered in children between 12 and 18 months of age. After 18 months the decision to do a spinal tap rests on the clinical suspicion of meningitis. Likewise, great care is needed in children who develop a febrile seizure while receiving antimicrobials, as antibiotic therapy may mask the clinical manifestations of meningitis. Results of our study support the outlined recommendations.

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