RESEARCH ARTICLE

MANAGEMENT OF SIMPLE FEBRILE SEIZURES; A STUDY CONDUCTED IN IMAM HOSPITAL, OROMIEH

N. Pashapour MD[1],
A. Maccoei MD[1],
V. Sheikhi MD[1]

Abstract:
Objective
Whatever the health field, compliance with the recommended practice guidelines or parameters for diagnosis by specialists and expert health professionals benefits the patients. This study was conducted to determine the whether or not these guidelines or parameters are applied to the evaluation of children with first simple febrile convulsion (SFC) in a regional teaching hospital.
Materials & Methods
In a prospective study conducted on children with SFC, admitted in the Pediatric ward of Imam hospital, Oromieh, records of investigations ordered between Jan 2003 and Dec 2004 for children diagnosed with SFC were collected. Practice parameters of the American Academy of Pediatrics (AAP) were employed as diagnostic standards. Applied practices were compared with AAP recommended practice parameters. Investigations performed included lumbar puncture, complete blood count, CRP, ESR, blood glucose, serum calcium, electrolytes, renal function tests, urinalysis, urine culture, and blood culture, chest X-ray, EEG and CT scan.
Results
Two hundred and fifty-one consecutive cases, aged 6-60 months, were evaluated. Complete blood count, blood glucose, serum calcium, serum electrolytes, renal function tests, urinalysis, urine culture, and blood culture were tested in all cases (100%). Lumbar puncture, chest X-ray, EEG and CT brain scan had been performed in 10%, 24%, 1.4% and 0.65% of cases, respectively. The mean number of routine investigations was twelve.
Conclusion
Compared to recommended practice guidelines the results of this study highlighted that children with first SFC had more often than necessary investigation. These, not only resulted in significant expense, they proved to be of little diagnostic value. Compliance with a centrally organized national program would significantly help to improve SFC evaluation.
Keywords: Febrile convulsion, Simple fébrile seizure, Lumbar puncture, Convulsion, Fever

1. Assistant Professor of pediatrics, Oromieh University of Medical Sciences
Corresponding author:
N. Pashapour MD
Home Tel: +98 441 3466400
Fax: +98 441 2780801
Email: npashapor@yahoo.com

Introduction

Febrile seizures, a most frequent neurological disorder in children, occur in 3-5% of children under the age of five years (1, 2). It is a benign condition with excellent outcomes but its mismanagement does however subject the patients to serious complications (3).

There are controversies about febrile convulsion evaluation, its recurrence risk and the long term outcome. Some authors belive that evaluation and management of simple febrile convuslsion can be dealt with in outpatient emergancy settings and the child can be sent home for further care (4).

The AAP has set specific guidelines for the neurodiagnostic evaluation of the child with a first simple febrile seizure (5). AAP practice parameters recommendations regarding neurodiagnostic evaluation of the child with a first simple febrile convulsion are lumbar puncture, electroencephalography (EEG), blood studies (serum electrolyte, calcium, phosphorus, magnesium, CBC, glucose); the parameters are intended for use by pediatricians, child neurologists, neurologist and other care providers who treat children for febrile convulsion (5).

Compliance with the practice guidelines by health workers is a measure for assessment of a medical center (7). Many studies investigating the etiology and natural history of febrile convulsions and evaluations of various management strategies are available, but relatively little information is documented about the hospital approach of febrile convulsions; a related literature search on Iran revealed a lack of data and no centrally organized national association program was found in this regard.. This study was undertaken to assess and compare compliance and necessity of investigations done for patients with simple febrile convulsions at our center with standard AAP practice guidelines.

Materials & Methods

This is a descriptive study of all patients, admitted with a diagnosis of first SFC, to the pediatric center of Imam Hospital, University of Ormieh Medical Science, over a one-year period between January 2004 and December 2004. The research council of the university approved this study. Data were obtained from patients' daily hospital records. All relevant data including detailed information on investigations, viz. [lumbar puncture(LP), complete blood count, CRP, ESR, blood glucose, serum calcium, serum electrolytes, renal function tests, urinalysis, urine culture, and blood culture, chest X-ray, EEG and CT scan]were collected; demographic, convulsion and fever characteristics, along with birth and family history were obtained. SFC was considered as generalized convulsions, lasting less than 15 min, not recurring within 24 hours, presenting in neurologically healthy infants and children between 6 months and 5 years of age; they were associated with fever >38°C rectal temperature, but without evidence of intracranial infection as a defined cause, having no history of prior afebrile convulsions and. with no postictal neuro-logical abnormalities. Chilren with pre-existing neurological deficits or developmental delay were excluded. Patients were divided regarding to their ages to three groups of less than 12 months, 12-18 months and over 18 months according AAP recommendations. AAP practice parameter recommendations on neurodiagnostic evaluation of the child with a first simple febrile convulsion are for lumbar puncture, electroencephalography (EEG), blood studies (serum electrolyte, calcium, phosphorus, magnesium, CBC, glucose), tests that we focused on and the actual investigations prescribed, conducted and recorded were then compared to the recommendations.

Results

Two hundred fifty one cases were evaluated; patient age ranged from 6 months to 5 years.

The number of male and female patients and their distribution were presented in table 1.

Results of investigations showed that upper respiratory tract infection, viral gastroenteritis, otitis media with frequencies of 49%, 24/7% and 4/7% respectively were the main causes of the fever.

For the 'less than 12 mo' group, average age was 10.90(CI 95% 10.45-11.35); for the '12-18 mo' group it was 16.33(CI 95% 15.86-16.81), and for the 'over 18 mo' group, it was 38.15(CI 95% 36.10-40.20). Frequencies of tests ordered are presented in table 2; although the lumbar puncture (LP) was prescribed for seventy-five cases, fifty cases rejected or refused the LP request, and ultimately twenty five cases underwent the procedure. Prescribed and refused lumbar puncture frequencies for the three age groups are shown in table 3. The mean number of routine investigations done was about twelve.

Table 1. Distribution of patients by age

Month	Less than 12	13-18	19-60
Female	16	28	52
Male	15	35	105
Total	31	63	157

Table 2. Frequency of tests ordered for simple FC

Test	Frequency	Percent
CBC	251	100
BS	251	100
BUN	251	100
Cratinin	251	100
Blood culture	251	100
Urine culture	251	100
Electrolyte(Na, K)	251	100
Urine analysis	251	100
Blood Calcium	251	100
CRP	251	100
ESR	251	100
Lumbar puncture	25	10
Chest x-ray	61	24/3
EEG	4	1/9
CT Scan	2	0.7/9

Table 3. Proposed and refused lumbar punctures frequencies

Group	No request	Rejects	Lp done	Total
Less than 12 months	3	16	12	31
12-18 months	26	25	11	62
19-60 months	147	9	2	158

Discussion

This study assessed laboratory tests carried out for patient with SFC at the first time, who were presenting at a University teaching hospital; all patient were tested for serum electrolyte, calcium, phosphorus, and CBC and blood glucose. On the basis of published evidence, the AAP recommends that serum electrolyle, calcium, phosphorus, magnasium, CBC and blood glucose not be performed routinely in the evaluation of a child with SFC; blood glucose determination should only be obtained if the child has a prolonged seizure. Appropriate history taking and physical examination enable identification of children who are dehydrated and have abnormal serum electrolyte values (5). After assessment of 203 patients, aged 3 months to 5 years, with a seizure associated with fever, Stuijvenberg et al concluded that leukocyte counts are rarely useful as a diagnostic tool in children with convulsion associated with fever (8). Some studies recommended only blood glucose tests as routine laboratory studies and an electrolyte test if a metabolic abnormality is being considered(9). Other papers confirm the APP opinion by suggesting that in FC, fever is most often due to viral infections of upper respiratory tract, acute otitis media, infections of urinary tract, gastrointestinal tract and febrile reactions after vaccinations. A good clinical examination is necessary to determine the focus of fever, and investigations would be indicated accordingly. Serum electrolytes, blood glucose, calcium, magnesium and blood counts are not always routinely required as a rule (10).

The presents study results revealed that LP was prescribed for 80.3%, 58.1% and 7% of cases in the 3 groups of less than twelve months, 12-18 and 19-60 months respectively. Resistance to procedure was observed in 51.6%, 40.3% and 88% of cases in the 3 groups, respectively. Fortunately clinical follow up of patients showed that all the cases that refused LP suffered no serious infections. The AAP strongly recommends LP in patients under 12 months of age presenting with fever and seizure because meningeal signs may be minimal or absent in this age group and LP must be considered in patients of 12 to 18 months of age as symptoms and signs of meningitis may be subtle. Also symptoms and signs of meningitis may also be masked in children with febrile convulsions who have received antibiotics; hence LP is warranted in such cases (5). In a child older than 18 months, although a lumbar puncture is not routinely warranted, it is recommended in the presence of meningeal sign, which usually presents with meningitis (5). In this regard two studies from Iran revealed that children with bacterial or aseptic meningitis had complex febrile convulsions and that meningitis was not a common finding in children with simple febrile convulsion (11,12). Riordan suggested that children with SFC and no symptoms or signs of meningitis are highly unlikely to have bacterial meningitis. Meningitis rarely presents as a SFC, but complex seizures, prolonged illness or toxicity are all indications for lumbar puncture (13). In contrast with AAP opinion, a study in Ghana supports routine LP in children with febrile convulsion because there was a 10/2% positive yield for bacterial meningitis in that research (14). A study from America revealed that in a hospital, physicians performed LPs in one fourth of children, aged below 18 months, with febrile convulsions in other patients however who did not undergo LP, no adverse events occurred. The researchers recommended

that the AAP guidelines regarding febrile convulsions in children need to be revised (15).

Carroll suggests that the routine lumbar puncture following a febrile convulsion in infancy is not only unjustified and potentially dangerous, but the child also has to bear unwanted pain and distress. It has been suggested that there even be a risk of introduction of organisms from the bloodstream into the CSF during lumbar puncture (16).

Refusal of requested LP is an obstacle to the continuation of proper management. In a study from Malaysia, 25%of patients refused the procedure (17). In this study LP prescribed in 12-18 months and older than 18 month was more than the recommended parameters, with many, two-thirds of cases, refusing to undergo the procedure. The AAP emphasizes that EEG should not be performed in the evaluation of children with simple FC. Results of this study showed that EEG was performed in 5 cases (1.9%). A joint working British group suggested that an EEG is not a guide to treatment or to prognosis. It is not helpful after a single or recurrent febrile convulsion(s) (18). Neuroimaging is not recommended by AAP in the routine evaluation of the child with a first simple FC. Only 2 cases (0.79%) of the children with simple FC, seen at our hospital had emergency CT brain scans, which revealed normal results;. this observation is in accordance with that of a retrospective analysis of 107 neurologically normal children, who presented with a possible first seizure(19). Cranial CT is normal in most cases of purulent meningitis, including those with subsequent herniation. Additionally, CT may be associated with long-term radiation effects. An accurate clinical history combined with recognition of the early systemic and neurological findings of bacterial meningitis will indicate a safe setting for performance of a diagnostic LP with little likelihood of complicating herniation (20). Although in academic institutions, inefficient use of diagnostic studies has long been considered one of the inherent costs of medical education (21), doctors must weigh the consequences of testing and treatment, including discomfort to the child, financial costs, and unintended consequences of false-positive results, against the small risks of serious bacterial infections (22). Hemophilus influenza meningitis may occur in our country more than developed countries because hemophilus influenza vaccine has not been included in Iran's national-wide routine vaccination programs. Results of some of our studies show contradictions with AAP recommendations. This study demonstrates that despite clear practice parameters, unnecessary investigations remain a common diagnostic feature for such children. A centrally organized Iranian program would be of great help in improving SFC evaluation in these patients.

Conclusion

The present study highlighted the fact that children with SFC were often extensively and unnecessarily investigated; not only resulting in a significant expense, these routine investigations proved to be of little diagnostic value. The need for coordination with a centrally organized Iranian program is strongly being felt and would certainly be helpful towards improving SFC evaluation.

References

1. Ling SG. Clinical characteristis and risk factors for a complex first febrile convulsion. Singapore Med J 2001;42: 264-267.
2. Winsley r, chellam K, Juluis X S. Intermittent colobazam therapy in febrile seizure. Indian J Pediatr 2005; 33: 31-33.
3. Parmar RC, Sahu DR, Bavdekar SB. Knowledge, attitude and practices of parents of children with febrile convulsion. JPGM 2001;47: 19-23.
4. Sadovsky R: Approach to young children with febrile seizure. American Family physician 2003;68: 1184.
5. Provisional committee on quality improvement, subcommittee on febrile seizure: Practice parameter. The neurodiagnostic evaluation of the child with a first simple febrile seizure. Pediatr 1996; 97: 796-771.
6. Daniel J Isaacman, Kimberly KaminerHari Veligeti, Michael Jones BA, Paris Davis, Jon D Mason. Comparative Practice Patterns of Emergency Medicine Physicians and Pediatric Emergency Medicine Physicians Managing Fever in Young Children. Pediatr 2001;108:354 -358.
7. Stuijvenberg MV, Moll HA, Steyerberg EW,et al. The duration of febrile seizure and peripheralleukocytosis. J Pediatr 1998;133: 557-558.
8. Sadovsky R. Approach to young children with febrile seizure. American Family physician 2003; 68: 1184.
9. Pratibha D, Singhi, M Srinivas. Febrile convulsion. Indian Pediatrics 2001;38: 733-740.
10. Ehsanipor F, Khodapanahandeh F, Aslani Z. The prevalence of meningitis in children with febrile seizure hospitalized at Hazrat Rasoul Hospital. Journal of Iran Univ of Med Sc 2003;44: 907-912.
11. Talebian A, Amiri GH. Clinical and CSF findings in infants

with initial episode of febrile convulsion. Journal of Gazvin Univ of Med Sc 2000;12:78-82.
12. Riordan F A I, Cant A J. When to do a lumbar puncture. Arch Dis Child 2002; 87 235-237.
13. Owusu A, Agnenyega T, Asong D, Scheld M. Routine lumbar puncture in children with febrile seizure in Ghana: should it be continue? International journal of infectious disease 2004;8: 353-361.
14. Ngo BG, Lomes JF. Performance of lumbar puncture in young children with febrile seizure. Academic Emergency Medicine 2004;11: 597.
15. Carroll W, Brookfield D. Lumbar Puncture following febrile convulsion.Arch Dis Child 2002;87: 238-240.
16. Ling SG, Boey CC. Lumbar puncture refusal in febrile convulsion. Singapor Med J 2000;41: 458-488.
17. Joint working group of the research unit of the royal college of physician and the british peadiatric association. Guidelines for the management of the convulsion with fever. BMJ 1991 ;303: 634-6.
18. Garvey MA, Gaillard WD, Russin JA et al. Emergency brain computed tomography in children with seizure:Who is most likely benefit? J pediatr 1998;133: 664-9.
19. William J. Oliver, Thomas C. Shope, Lawrence R. Kuhns. Fatal Lumbar Puncture: Fact Versus Fiction-An Approach to a Clinical Dilemma. pediatr 2003; 112 : 174-176.
20. Hampers LC, Cha SB, Gutglass DJ, Krug SF, Binns H. The effecet of price information on test-ordering behaviour and patient outcome in pediatric emergency department. Pediatr 1999;103: 877-883.
21. Jonathan A. Finkelstein, Cindy L. Platt C, et al. Fever in Pediatric Primary Care: Occurrence, Management, and Outcomes. Pediatr 2000;105:260-266.