Pattern of Febrile Convulsion Among Children in Gharian Teaching Hospital

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ABSTRACT

Objective: Febrile convulsion (FC) is the most common neurological disorder in childhood with a generally good prognosis. It is defined as a seizure occurring in a child aged 6 months to 5 years, associated with a fever arising from an infection or inflammation outside the central nervous system in an otherwise neurologically normal child. The aim of this study was to evaluate the clinical pattern and practice parameters applied to the management of children with FC seen at the Pediatric Department of Gharian Teaching Hospital using established audit measures suggested in the literature.

Methods: Practice parameters of the American Academy of Pediatrics (AAP) and audit measures recommended by the Joint Working Group of the Research Unit of the Royal College of Physicians and the British Paediatric Association were employed as standards. Retrospective records between January and December 2009 with the diagnostic coding of febrile convulsion, convulsion, status epilepticus, or meningitis were reviewed. Areas assessed included appropriate documentation of hospital records and unit statistics (adverse outcomes, inappropriate investigations, and treatment).

Results: A total of 124 consecutive records were evaluated. In the documentation of Gharian hospital notes, an accurate description of seizures was observed. Simple febrile convulsions were present in 120 cases (97%), while complex febrile convulsions were found in 4 cases (3%). Regarding unit statistics, investigations performed included a complete blood count (CBC), blood glucose, serum calcium, serum electrolytes, renal function tests, urinalysis, and electroencephalography (EEG).

Conclusions: The present study showed that the use of unnecessary laboratory and diagnostic investigations was common. These investigations, though resulting in significant financial expense, proved to be of little diagnostic value. Diagnostic procedures such as lumbar puncture and brain imaging should be performed only when proven to be indicated according to the patient's clinical condition or medical history.

1. Introduction

Febrile convulsion (FC) is the most common neurological disorder in childhood with a good prognosis. Febrile convulsion is one of the most common causes of hospitalization of children in pediatric wards, typically occurring in children between 5 months and 6 years of age. The incidence is reported to be 2–4% in different communities; however, in some populations, it has been reported to range between 7–14%.

The exact pathogenesis of this condition remains unknown, although genetics plays an important role in the etiology of FC. The convulsion is attributed to fever when other causes of convulsion, such as metabolic imbalances or central nervous system (CNS) infections, are ruled out. The International League Against Epilepsy (ILAE) defines a febrile seizure as *"a seizure occurring in childhood after one month of age, associated with a febrile illness not caused by an infection of the central nervous system, without previous neonatal seizures or a previous unprovoked seizure, and not meeting criteria for other acute symptomatic seizures."*

The most critical clinical point is establishing the correct diagnosis of the precise underlying illness causing the seizure, thereby facilitating differentiation between FC and other causes of convulsion. Parents who are frightened and worried about their child's febrile convulsion must be counselled and trained to help their child as much as possible. FC has a good prognosis, and in most cases, children appear to suffer no subsequent long-term effects. While recurrent FCs occur in one-third to one-quarter of children, epilepsy develops in only about 2% of children overall by the age of 7 years.

FCs are typically divided into two types: "simple" and "complex". A simple febrile convulsion is defined as a primary generalized seizure lasting less than 15 minutes, which does not recur within 24 hours and resolves spontaneously. Conversely, a complex febrile convulsion is defined as focal or prolonged (>15 minutes), and/or featuring more than one convulsion within a 24-hour period.

In this study, patients admitted to Gharian Teaching Hospital with a final diagnosis of febrile convulsion were investigated. The practice parameters provide recommendations for children who are neurologically healthy, aged between 6 months and 5 years, and who have experienced one or more simple FCs. Febrile convulsion should be distinguished from "convulsion with fever", which includes any convulsion in a child with a fever of any cause. Thus, children with meningitis, encephalitis, or cerebral malaria do not have febrile convulsions but rather convulsions with fever. The same differentiation applies to children with severe pre-existing neurological disorders and/or severe mental retardation.

2. Materials & Methods

Data of patients admitted to Gharian Teaching Hospital with a final diagnosis of FC were reviewed. The analysis studied 124 cases admitted between January to December 2009. Data were recorded using specific structured questionnaires and analyzed using SPSS software.

3. Results

Data from 124 children were analyzed, consisting of 55 (44%) females and 69 (56%) males with a diagnosis of FC over a one-year period. The mean age at admission was 19.8 months with a median of 17 months. The male-to-female ratio was 1.4:1. Around 4% of the patients had complex febrile convulsions, characterized by one or more of the following: focal seizure, duration of more than 15 minutes, or more than one episode of seizure within 24 hours.

None of the patients had any neurological deficits upon discharge. A total of 121 (97%) patients were discharged home well. In this study, 120 cases (97%) had simple febrile convulsions and 4 cases (3%) had complex convulsions; no patients developed status epilepticus. A family history of FC was positive in 8.8% of cases, including first, second, and third-degree relatives. Body temperature at admission was above 38.5°C in 75.8% of patients, and equal to or less than 38.5°C in 45.9% of patients. Normal results for neurological examinations were obtained in 98.4% of patients, while 1.6% exhibited abnormal results.

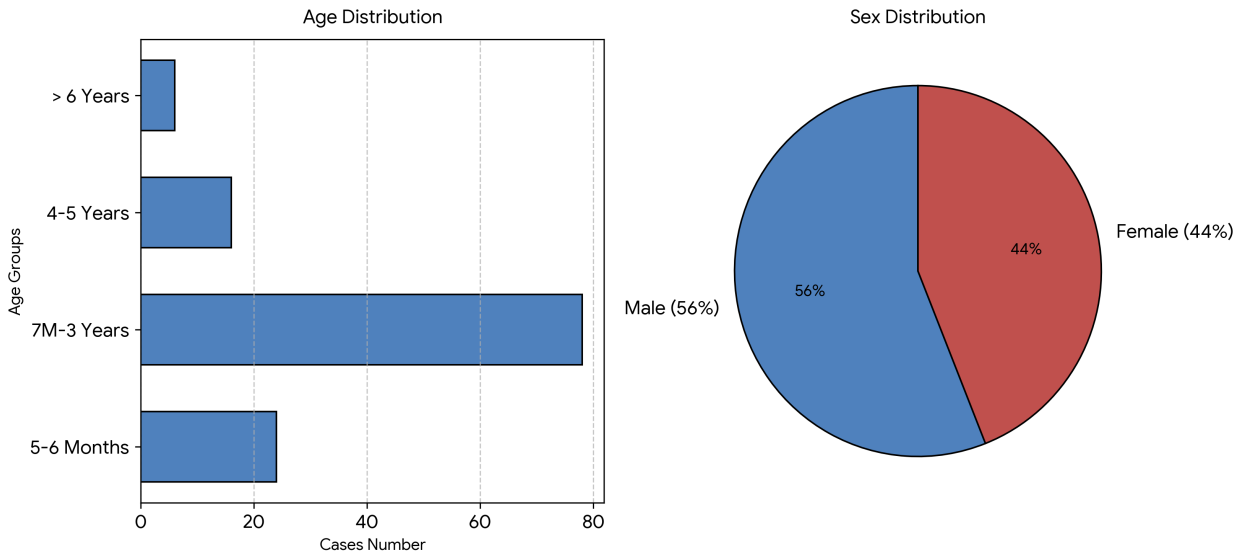


Figure 1: Age and Sex distribution profiles among the studied cohort (n=124).

Regarding diagnostic and laboratory investigations performed:

- **Lumbar Puncture (LP):** Performed in 20 cases, all showing normal cerebrospinal fluid (CSF) results.
- **Electroencephalogram (EEG):** Performed in 14 patients, with abnormal results seen in 2 cases (1.6%).
- **Brain CT / MRI:** Performed in 10 patients, with results being completely normal in all cases.
- **Leukocytosis (WBC > 15,000/µL):** Was observed in 60 cases (>50%).
- **Anemia (Hb < 11 g/dL):** Was present in 20 patients (16%).
- **Elevated Inflammatory Markers:** ESR (>30 mm/h) was noted in 8 cases (6.5%) and elevated CRP (>6 mg/L) was seen in 27 cases (21.7%). Biochemical tests (serum sodium, potassium, calcium, and glucose) were completely within normal limits.

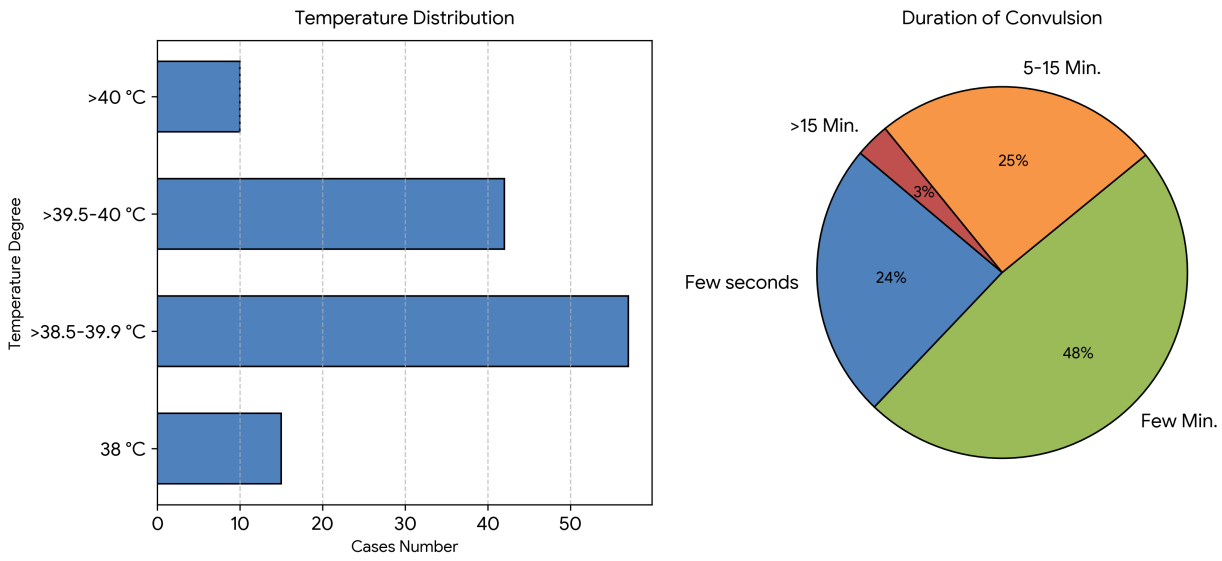


Figure 2: Distribution of admission body temperature and total duration of febrile convulsion episodes.

4. Discussion

This pilot study is the first of its kind in Gharian, assessing the clinical pattern of FC at a regional teaching hospital. It demonstrates that despite clear clinical practice parameters, unnecessary investigations and treatments remain common. Better documentation regarding the presence or absence of signs of meningitis, alongside parental counseling on FC management, is highly required.

Routine blood investigations (complete blood count, blood glucose, electrolytes, urea, and creatinine) were completed for over 98% of cases. However, on the basis of published medical evidence, the American Academy of Pediatrics (AAP) recommends that routine blood studies are of no clinical benefit in the routine evaluation of children with simple FC. Blood glucose determination should only be obtained if the child has a prolonged seizure or altered mental state. A complete blood count may be useful primarily in the evaluation of fever source, particularly in younger children. Appropriate history taking and thorough physical examination enable the identification of children who are dehydrated or have abnormal serum electrolyte values. In our study, abnormal biomedical tests were rarely seen.

Brain electroencephalograms (EEG) have limited value in the diagnostic evaluation of a child with a simple febrile convulsion. In our study, a brain EEG was performed on 14 cases, and the results were abnormal in only 2 cases (1.6%). Dodson considered MRI or neuroimaging necessary only in the diagnostic evaluation of a child who presents with status epilepticus, whether febrile or not.

In a case-control study carried out by Kobrinski and colleagues, anemia was found in 25.1% and 26.6% of the case and control groups, respectively. We found anemia in 16% of our patients, which we believe is related to the high baseline prevalence of Iron Deficiency Anemia in Libya. Different studies show that the prevalence of Iron Deficiency Anemia in women and children in the region is between 30% to 50%. Based on our findings, in a child diagnosed with a febrile convulsion (especially a simple febrile convulsion), there

is no medical need for extensive paraclinical evaluation or unnecessary financial expenditure unless there are clear clinical indications for more advanced studies.

5. Recommendations

The present study highlights that children presenting with FC are often extensively and unnecessarily investigated. Though resulting in significant financial expense, routine investigations proved to be of little diagnostic value. The routine clinical need for active antipyretics and overnight hospital stays is questioned for this benign condition. This study suggests that we could improve patient management through better clinical documentation, especially concerning parental counseling. Regular prophylaxis with Diazepam Suppositories whenever the child becomes febrile, and the structured availability of these suppositories, should be secured by the hospital to reduce the risk of recurrence, which is a common anxiety for parents, and to avoid the potential development of secondary epilepsy.

6. References

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