

ABSTRACT

Introduction

Febrile seizures are the most common type of seizures in children under six years of age and represent one of the leading causes of hospitalization in this age group. They most frequently occur in the course of childhood infections and less commonly as adverse events following immunization, usually associated with a fever-related systemic response. The epidemiology of febrile seizures has undergone significant changes, particularly influenced by the COVID-19 pandemic, which initially led to a decrease in diagnoses followed by a subsequent increase during the Omicron variant era. Fever, an integral component of febrile seizures, remains one of the most alarming symptoms for caregivers and continues to pose diagnostic and therapeutic challenges. Numerous risk factors for the occurrence and recurrence of febrile seizures have been described in the literature, including age, family history, metabolic parameters, and infection etiology. The classification of febrile seizures into simple and complex types has important clinical implications, as it determines the extent of diagnostic evaluation and management. Although most episodes are benign and self-limiting, prolonged or complex seizures require prompt pharmacological intervention. Despite extensive research, no uniform and widely accepted management algorithms for the first episode of febrile seizures have been established, resulting in considerable variability in clinical practice both in prehospital and hospital settings.

Aim of the study

The aim of this study was to assess the clinical course of the first episode of febrile seizures in hospitalized children. The influence of infection etiology on disease severity and length of hospitalization was analyzed. Demographic, clinical, and laboratory factors associated with a more severe clinical course were identified. The usefulness of selected laboratory parameters as potential predictors of disease severity and

hospital stay duration was evaluated. Additionally, the scope and appropriateness of diagnostic and therapeutic management in emergency departments and pediatric wards were assessed in relation to current clinical management algorithms.

Material and methods

The retrospective study analyzed data from 250 children aged 6 months to 6 years who were hospitalized at the Polish Mother's Memorial Hospital Research Institute in Łódź between 2020 and 2022 due to a first episode of febrile seizures. Medical records containing demographic, clinical, and laboratory data were reviewed, anonymized, and subjected to statistical analysis. The seizure course, fever-related clinical symptoms, laboratory findings, neuroimaging studies, and the including antibiotic and antiviral therapy, as well as length of hospitalization, were also analyzed. Infection etiology and final diagnoses according to the ICD-10 classification were evaluated.

Results

The study group consisted of 250 children hospitalized for a first episode of febrile seizures, with a predominance of boys (63%); the median age was 1,5 years and did not differ significantly between sexes. Patient age had no significant effect on seizure type or fever duration; however, a marked seasonal pattern was observed, with the highest incidence during winter and early spring. Children transported by emergency medical services (83,2%) more frequently presented with a severe general condition, and fever duration was positively correlated with length of hospitalization. Prolonged seizure duration was associated with deeper disturbances of consciousness and lower bicarbonate levels. Simple febrile seizures accounted for the majority of cases (94,4%), whereas complex febrile seizures were more often associated with extended diagnostic evaluation and a tendency toward longer hospital stays. Elevated inflammatory markers at admission, particularly CRP and PCT, were

associated with prolonged hospitalization and were more frequently observed in children with bacterial (56%), who required antibiotic therapy and exhibited a more severe clinical course. Diagnostic and therapeutic management was primarily determined by the patient's clinical presentation.

Conclusions

Infection etiology significantly influenced the clinical course of the first episode of febrile seizures, with bacterial infections being associated with greater disease severity and longer hospitalization compared to viral infections. Demographic factors, including age and sex, did not significantly affect clinical severity, despite the higher incidence of febrile seizures among boys. Fever duration and seizure length were significantly associated with neurological symptom severity, length of hospital stay, and the occurrence of acid-base disturbances. The extent of diagnostic and therapeutic management was primarily guided by clinical presentation and was consistent with current management algorithms.