

A Prospective Case Series on the Hospital Management of Simple Febrile Seizures in Children

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ABSTRACT

Aim:

Simple febrile seizures (SFS) are common neurological events in children aged 6 months to 5 years, presenting as brief, generalized seizures associated with fever, without CNS infection or metabolic abnormalities. To evaluate the clinical management of SFS in children admitted to a government hospital.

Methods:

A prospective case series was conducted in the Department of Pediatrics, Government Medical College, Nagapattinam, from October to December 2024. Forty children with SFS were included. Data on treatment strategies and outcomes were recorded using a structured case report form.

Results:

Of the 40 children, 52.5% were female and 47.5% male. Benzodiazepines were administered in 97.5% of cases, primarily lorazepam (47.5%) and midazolam (30%). Clobazam was used for follow-up in 67.5%. Antipyretics (100%)—mostly paracetamol in syrup (45%), tablet (37.5%), and injectable (17.5%) forms—were universally given. IV fluids, mainly DNS, were used in 60% of cases. Despite viral etiology, antibiotics were prescribed in 85%, and anti epileptics in 20%.

Discussion

SFS is effectively managed with antipyretics and benzodiazepines. However, the routine use of antibiotics and antiepileptics should be reassessed to prevent unnecessary treatment.

Keywords: antipyretics, benzodiazepines, paracetamol, pediatrics, antibiotic use

without evidence of intracranial infection, metabolic disturbance, or a history of afebrile seizures.^[11] These seizures are generally classified into two types: simple and complex. Simple febrile seizures (SFS) are generalized, last less than 15 minutes, and do not recur within 24 hours.^[15]

The incidence of febrile seizures ranges from 2% to 5% among neurologically healthy children, with varying rates depending on geographic and genetic factors.^[10] Although SFS have a benign prognosis, they are often a cause of significant anxiety for parents and may result in unnecessary investigations and treatments, including the use of antiepileptic drugs and antibiotics.^[7]

According to the American Academy of Pediatrics (AAP), the management of SFS should focus on identifying the underlying cause of fever and providing symptomatic relief. Antipyretics are commonly used to control fever and provide comfort but do not prevent seizure recurrence.^[7] In acute cases, benzodiazepines such as lorazepam or midazolam are used to stop seizures, with intranasal midazolam being as effective and easier to administer than diazepam.^[12]

Initial and Prehospital Management.
:During an acute episode, basic life support (ABCs: airway, breathing, circulation) should be assessed and ensured. The majority of SFS resolve spontaneously within 1–2 minutes before arriving at a medical facility.^[2] 2. Rescue Medication for Prolonged SFS Benzodiazepines are the treatment of choice if the seizure exceeds 5 minutes.^[4] Buccal midazolam (0.5 mg/kg) is favored for its ease of use, rapid onset, and low risk of respiratory depression.^[3] Rectal diazepam (0.3–0.5 mg/kg) is an alternative, though its absorption is less predictable [5]. For children under 3 years, rectal diazepam (5 mg) is commonly used; for older children, buccal midazolam is preferred^[6]. A second dose may be

I. INTRODUCTION

Febrile seizures (FS) are the most common type of seizures seen in the pediatric population, typically occurring between the ages of 6 months and 5 years in association with fever, but

given after 5–10 minutes if seizures persist, but not more than two doses due to risk of respiratory depression ^[6]

Paracetamol or ibuprofen can be used to relieve fever-related discomfort. However, antipyretics do not prevent seizure recurrence and should not be given prophylactically. Paracetamol or ibuprofen may be used to reduce fever discomfort, but do not prevent recurrence of febrile seizures ^[8] when to Avoid AEDs. Chronic antiepileptic drugs (e.g., phenobarbital, valproate) are not recommended due to unfavorable risk-benefit ratio in SFS ^[9]

To identify cases of simple febrile seizures and to evaluate their complete management in a hospital setting.

The objective of this case series is to identify cases of simple febrile seizures and to describe their clinical management in a hospital setting.

II. METHODOLOGY

This case series was conducted in the Department of Pediatrics at Government Medical College, Nagapattinam over a period of three months, from October 2024- December 2024. Only children diagnosed with simple febrile seizures (SFS) were included in the study.

Inclusion Criteria

- Children aged between 6 months and 5 years
- Seizure duration less than 15 minutes
- No recurrence of seizure within 24 hours
- No previous history of afebrile seizures
- No evidence of central nervous system infection or metabolic disturbance

Exclusion Criteria

- Complex febrile seizures
- Afebrile seizures
- Seizures with focal features or prolonged duration.

Data Collection and Analysis

Data were collected using a pre-designed case report form. Clinical features, seizure description, fever history, and management steps were documented.

Data were collected prospectively from pediatric patients presenting with simple febrile seizures during the study period at Government Medical College, Nagapattinam. A structured case report form was used to record relevant clinical information.

The following data were collected for each patient:

- Demographic details: age, sex
- Management provided: Emergency intervention (if seizure ongoing) Antipyretic administration (e.g., paracetamol), Use of benzodiazepines (if needed), Monitoring and supportive care.
- Data were analyzed using descriptive statistics (percentages) with Microsoft Excel

III. LITERATURE REVIEW

Febrile seizures (FS) represent the most prevalent neurological condition in the pediatric population, with an estimated incidence ranging between 2% and 5% among neurologically normal children aged 6 months to 5 years [10]. These seizures are classified into simple and complex types, with simple febrile seizures (SFS) being generalized, of short duration (<15 minutes), and not recurring within 24 hours. Although SFS is typically benign, its presentation often evokes significant parental concern, sometimes leading to the overuse of diagnostic investigations and pharmacological interventions [7].

Clinical guidelines from the American Academy of Pediatrics (AAP) emphasize that the management of SFS should be conservative and primarily supportive, focusing on identifying the underlying cause of fever and alleviating symptoms rather than initiating long-term antiepileptic therapy [1,15]. Antipyretics such as paracetamol or ibuprofen are commonly used for symptomatic relief; however, they have not been shown to reduce the recurrence of febrile seizures [8].

Acute seizure management generally involves the use of benzodiazepines when seizures are prolonged beyond 5 minutes. Studies have demonstrated that buccal midazolam is at least as effective as rectal diazepam and has a more favorable administration profile in emergency settings [4,12]. Intranasal and intravenous midazolam, as well as injectable lorazepam, have also proven effective in seizure termination with acceptable safety margins [12].

Despite strong evidence discouraging the use of antibiotics in the absence of a confirmed bacterial infection, multiple studies—including that by Vishwanath and Suresh (2019)—highlight the continued empirical use of antimicrobials in children with SFS, often driven by precautionary clinical practices rather than guideline-based decision-making [14]. Furthermore, chronic administration of antiepileptic drugs such as

valproate or phenobarbital is not recommended due to the unfavorable risk-benefit profile and lack of evidence supporting their efficacy in preventing recurrence [9,13].

IV. RESULT

A total of 40 pediatric cases diagnosed with simple febrile seizures were included in the study. A slight female predominance was observed, with females accounting for 52.5% (21 cases) and males for 47.5% (19 cases). The data depicted in the Table 1.

Table 1 : Gender wise distribution in simple febrile seizure

Gender	No. of. Cases (n=40)	Percentage (%)
Male	19	47.5%
Female	21	52.5%

Out of the 40 pediatric cases reviewed, benzodiazepines were administered in 97.5% of cases (39 children). Antiepileptic medications were given in 20% of the cases (8 children).

Antibiotic therapy was initiated in 85% of the cases (34 children). Antipyretic treatment was provided to all children, accounting for 100% of the cases. The data depicted in the Table 2.

Table : 2 Distribution of category of drugs in simple febrile seizure

Category	Count	Percentage (%)
Benzodiazepines	39	97.5%
Antiepileptics	8	20%
Antibiotics	34	85%
Antipyretics	40	100%

Intravenous fluids were administered in 24 cases (60%). Among them, dextrose normal saline (DNS) was used in 20 cases (83.3% of fluid-administered cases), normal saline in 3 cases

(12.5%), and Ringer lactate in 1 case (4.2%). Additionally, hypertonic saline (3% NaCl) was administered intravenously in 3 cases (7.5%). The data presented in the Table 3.

Table : 3 Distribution of intravenous fluids in simple febrile seizure

Fluid type	Count	Percentage (%)
Ringer Lactate (RL)	1	2.5%
Normal Saline (NS)	3	7.5%
Dextrose NS (DNS)	20	50%
Total	24	60%

Antipyretics were administered in all cases (100%), with paracetamol being the only agent used. It was given as tablets in 37.5% of

cases (15), injections in 17.5% (7), and syrups in 45% .The data depicted in the Table 4.

Table : 4 Distribution of antipyretics (paracetamol) in simple febrile seizure.

Form	Count	Percentage (%)
Tablet	15	37.5%
Injection	7	17.5%
Syrup	18	45%
Total	40	100%

Benzodiazepines were administered as part of seizure management. Lorazepam was given via injection in 19 cases (47.5%). Clobazam tablets were used in 27 cases (67.5%) for ongoing seizure

control. Midazolam was administered in 12 cases (30%) through the injectable route. The data is presented in the Table 5.

Table : 5 Distribution of benzodiazepines in Simple febrile seizure

Drug	Form	No. of Cases (n)	Percentage (%)
Lorazepam	Injection	19	47. 5%
Clobazam	Tablet	27	67.5%
Midazolam	Injection	12	30%

Antiepileptic drugs were used in 20% of cases (8). Sodium valproate and levetiracetam were each administered in 17.5% of cases (7), phenytoin

in 12.5% (5), and topiramate in 2.5% . The data is depicted in the table 6.

Table : 6 Distribution of Antiepileptics in simple febrile seizure

Drug	Form	No. of Cases (n)	Percentage (%)
Levetiracetam	Injection	7	17. 5%
Phenytoin	Injection	2	5%
	Tablet	3	7.5%
Sodium Valproate	Tablet	7	17. 5 %
Topiramate	Tablet	1	2. 5%

Antibiotic therapy was initiated in 85% of the cases (34). Ceftriaxone was the most frequently administered antibiotic, used in 30% of cases (12),

followed by Amikacin in 12.5% (5), Gentamycin in 5% (2), amoxicillin in 2.5% (1) . The data depicted in the table 7.

Table : 7 Distribution of Antibiotics in simple febrile seizure.

Antibiotic Class	Drug Name	No. of Cases (n)	Percentage (%)
Cephalosporins (3rd Gen)	Cefotaxime	13	32.5%
	Ceftriaxone	12	30%
Aminoglycosides	Amikacin (Injection)	5	12.5%
	Gentamicin (Injection)	2	5%
Penicillins	Amoxicillin (Tablet)	1	2.5%
	Total	24	60%

Among the 40 cases of patients, Ranitidine was prescribed in 12 cases (30%) for gastrointestinal support. Among these, the tablet form was administered in 2 cases (5%), while the injection form was given in 10 cases (25%).

For the management of nausea and vomiting, ondansetron was administered as an

injection in 8 cases (20%). A fixed-dose combination tablet (BCT) was prescribed in 7.5% of the cases (3 children). Among supportive medications, chlorpheniramine was administered in 17.5% of the cases (7 children). The data presented in the Table 8.

Table : 8 Distribution of supportive medication in simple febrile seizure

Category	Drug	Form	No. of Cases (%)
Gastrointestinal Support	Ranitidine	Tablet	2 (5%)
		Injection	10 (25%)
	Total		12 (30%)
Antiemetic	Ondansetron	Injection	8 (20%)
Supplement	B -complex	Tablet	3 (7.5%)
Antihistamine	Chlorpheniramine	Tablet	7 (17.5%)

V. DISCUSSION

Among the 40 pediatric cases with simple febrile seizures (SFS), a slight female predominance was observed, with 52.5% being female. This is similar to the findings of Vestergaard et al., who reported no strong gender bias in febrile seizure cases.^[10]

Out of all 40 cases, antipyretics were administered to 100% of the children, mainly in the form of paracetamol syrup. This reflects standard pediatric practice for fever management. However, as stated by Offringa et al., antipyretics improve comfort but do not prevent seizure recurrence.^[11]

Benzodiazepines were used in several cases for seizure control. Specifically, clobazam was prescribed in 27 cases (67.5%), lorazepam in 19 cases (47.5%), and midazolam in 12 cases (30%). Lorazepam and midazolam were given via injection, aligning with emergency protocols. According to McMullan et al., midazolam, especially through intranasal or intravenous routes, is effective and easier to use than diazepam.^[12]

Among the 40 cases, 8 children (20%) received antiepileptic drugs (AEDs) such as sodium valproate, levetiracetam, or phenytoin. However, Shinnar and Glauser state that chronic AED therapy is not usually required in SFS because the condition is self-limiting with a good prognosis. The use in these cases may be influenced by physician judgment or parental anxiety.^[13]

A high number of children—34 out of 40 cases (85%)—were prescribed antibiotics, mostly ceftriaxone. Since febrile seizures are often viral in origin, this suggests possible overuse. Vishwanath and Suresh reported similar findings in their study and emphasized the importance of antibiotic stewardship.^[14]

Supportive care was also provided in many cases. Intravenous fluids were given in 24 children (60%), while gastrointestinal drugs like ranitidine and ondansetron were used in 12 (30%) and 8 (20%) cases respectively to manage associated symptoms such as vomiting or gastric discomfort.

In summary, the management of simple febrile seizures among these 40 cases mostly followed standard recommendations, especially with the use of antipyretics and emergency seizure control medications. However, the frequent use of antibiotics and AEDs highlights the need for more cautious and evidence-based prescribing, as supported by current guidelines.^[15]

Initial Management of Febrile Seizures at Home^[16]

1. Stay calm and avoid panic; loosen the child's clothing and ensure they are protected from injury.
2. Do not insert fingers or any objects into the child's mouth, and avoid giving any fluids or medications during the seizure.
3. Do not splash water or wet the child during the seizure episode.
4. If the child is unconscious, place them in the lateral (side-lying) position to reduce the risk of aspiration.
5. Once the seizure has stopped, maintain the child in the lateral position to promote recovery and prevent airway obstruction.

VI. CONCLUSION

This case series shows that hospital management of simple febrile seizures mostly follows clinical guidelines, especially with the use of antipyretics and benzodiazepines for seizure control. Since simple febrile seizures are usually self-limiting with a good outcome, treatment should focus on supportive care and educating parents.

LIMITATION

This study is limited by its small sample size and single-center design, which may affect the generalizability of the findings. Additionally, the impact of parental counselling was not formally assessed, which could have provided valuable insights into caregiver education and understanding.

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