

## GUIDELINE REVIEW

## Evidence based guideline for post-seizure management in children presenting acutely to secondary care

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This evidence based guideline covers the immediate management of a child presenting to hospital with a febrile or afebrile seizure, once the fit has stopped.

The number of children in the UK presenting to accident and emergency (A&E) departments continues to increase, with rising rates of hospital admission. Approximately 5% of children attending A&E departments do so following a seizure. The management of these children including the decisions on initial investigations and whether to admit to hospital is often variable and taken by junior doctors.

In 1999 a group of paediatricians from Nottingham and Wakefield, the Paediatric Accident and Emergency Research Group, completed an evidence based guideline on the management of children presenting acutely to a secondary care facility following a seizure. It is underpinned by a systematic literature review, which was strengthened and updated in 2002. Recommendations are graded A to D, and linked explicitly to four levels of evidence using a system developed by SIGN (Scottish Intercollegiate Guideline Network; see table 1).

A modified Delphi consensus process was used to provide clinical expertise and assist in decisions where evidence was weak or lacking. A panel of paediatricians and A&E doctors, consultants, junior doctors, and nurses was provided with provisional statements together with copies of all relevant publications, and asked to rate their level of agreement. Panellists' identities were not revealed to participants. The resulting responses were summarised and fed back to participants, who were invited to modify their original responses. A total of three rounds were used to achieve consensus, obtained when a predefined degree of agreement was reached.

The documentation includes a management algorithm, a care pathway, and separate patient information leaflets for febrile and afebrile convulsions. The guideline was piloted in an accident and emergency department and changes in practice documented. Audit criteria are included.

**KEY POINTS**

Key points from the guideline include the following.

**Afebrile seizure**

- By the age of 16 years approximately 1% of the population will have suffered a seizure

without a fever (grade B). Approximately 50% of children who have an afebrile seizure will have a recurrence (grade B).

- The differential diagnosis of a child with a first afebrile seizure includes (grade C): isolated seizure, primary epilepsy, symptomatic epileptic seizure, neonatal or early infant seizures, convulsive syncope, arrhythmia, suffocation, psychogenic seizure.
- A child established on anticonvulsant medication who presents with a seizure without explanation should have an anticonvulsant level checked if they are on any of the following anticonvulsants: phenytoin, phenobarbitone, ethosuximide, carbamazepine, lamotrigine, and sodium valproate (grade B recommendation).
- All children presenting with an afebrile seizure should have their blood pressure measured at the time of presentation (Delphi consensus, no published evidence).
- A finger prick blood glucose should be performed if a child is still convulsing or not fully alert (grade D recommendation).
- It is not necessary routinely to check a full blood count, urea and electrolytes, calcium, or magnesium following a first afebrile seizure or a recurrent seizure, unless history or examination features suggest otherwise (grade C recommendation).
- There is no need for an EEG following a first simple afebrile seizure (grade B recommendation).
- Following a first afebrile seizure, children conforming to the stated criteria (table 2) should be admitted to an acute paediatric facility for observation and further investigation. Children who do not conform to the stated criteria for admission following an afebrile seizure should have a paediatric outpatient referral. (Both Delphi consensus, no published evidence)

**Febrile seizure**

- The population risk of febrile seizure is 2.7–3.3%. The risk of recurrence of febrile seizure following a first febrile seizure is 29–35% (both grade B).
- A family history of seizures febrile or afebrile, initial multiple seizures, and temperature less than 40° are all associated with an increased risk of recurrent febrile seizures (grade B).
- The risk of epilepsy following a simple febrile seizure is 1–2.4% (grade C). The risk of

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**Table 1** Levels of evidence and recommendation grades

Recommendation grade	Level of evidence	Description of evidence
Grade A	1++	Evidence obtained from at least one high quality meta-analysis, systematic review, or randomised controlled trial with a very low risk of bias, directly applicable to the target population, and showing overall consistency of results.
Grade B	2++	Evidence from high quality systematic reviews of case-control or cohort studies or high quality case-control or cohort studies with a very low risk of confounding, bias, or change and a moderate probability that the relation is causal, directly applicable to the target population, and showing overall consistency of results.
	1++	Extrapolated evidence obtained from at least one high quality meta-analysis, systematic review, or randomised controlled trial with a very low risk of bias.
	1+	Extrapolated evidence from well conducted meta-analyses, systematic reviews of randomised controlled trials, or randomised controlled trials with a low risk of bias.
Grade C	2+	Evidence obtained from well conducted case-control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relation is causal, directly applicable to the target population, and showing overall consistency of results.
	2++	Extrapolated evidence from high quality systematic reviews of case-control or cohort studies or high quality case-control or cohort studies with a very low risk of confounding, bias, or change and a moderate probability that the relation is causal.
Grade D	3	Evidence from non-analytical studies, e.g. case reports, case series.
	4	Evidence from expert opinion.
	2+	Extrapolated evidence from well conducted case-control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relation is causal.

epilepsy following a complex febrile seizure (this is defined) is 4.1–6% (grade B).

- The risk of bacterial meningitis in children presenting with febrile seizures is 0.6–6.7% (grade C).
- Any child with definite nuchal rigidity should be treated as having meningitis (grade C recommendation).
- Clinicians should have a higher level of suspicion of meningitis following a complex febrile seizure compared to a simple seizure (grade C recommendation).
- A child presenting with a complex febrile seizure with no clinical signs of meningitis should be observed closely and reviewed within two hours (Delphi consensus, no published evidence).
- Contraindications to lumbar puncture include (Delphi consensus, no published evidence): drowsiness or impairment of consciousness, signs of septicaemic shock, clinical diagnosis of invasive meningococcal infection with typical haemorrhagic rash, signs of raised intracranial pressure, or focal neurological signs.
- Children with any of the following features have an increased risk of meningitis and a lumbar puncture should be considered if there are no contraindications (grade C recommendation):

- History features: at least three days of illness, seen by GP in previous 24 hours, drowsiness at home, vomiting at home.
- Complex features: focal, duration more than 15 minutes, multiple seizures in 24 hours.
- Physical signs: petechiae, dubious nuchal rigidity, drowsiness, convulsing on examination, weakness on examination, bulging fontanelle.

- No evidence was found to support the suggestion that children below a certain age do not exhibit the signs of meningitis, and therefore the lumbar puncture criteria are not age specific.
- Criteria for admission to a paediatric observation area for a period of at least two hours include (Delphi consensus, no published evidence): all children below 18 months; and children with a simple febrile seizure, >1 year of age, and with no serious features from the history or examination findings indicating meningitis, who have had prior antibiotic treatment.
- Children with no focus for infection can be discharged home if the child looks well, parents/carers have ready access to health care if required, and they are happy with this decision (Delphi consensus, no published evidence).
- Consider the following differential diagnoses of fever when seeing children with febrile seizures (grade C recommendation): viral infection; otitis media; tonsillitis; urinary tract infection; gastroenteritis; lower respiratory infection; meningitis; post-immunisation; post-ictal fever (following generalised seizure of >10 minutes).
- A finger prick blood sugar should be checked if the child is still seizing at the time of presentation or is not fully alert (grade D recommendation).
- In a child with a simple febrile seizure, a urine sample should be obtained to check for infection (Delphi consensus, no published evidence).
- In a child with a simple febrile seizure no other investigation is routinely indicated (grade C recommendation).
- Parents should be given an information leaflet on febrile seizures and the management of fever (grade C recommendation).

**Table 2** Admission criteria following an afebrile seizure

Category	Criteria/signs
Age	Less than 1 year
Neurology	Glasgow coma scale (or equivalent) <15 (>1 hour post-fit) New neurological signs
Raised intracranial pressure	Papilloedema, tense fontanelle
Generally unwell	Irritable, uninterested, vomiting
Meningism	Kernig's sign positive, photophobia, neck stiffness
Complex seizure	Prolonged (>15 minutes), focal, recurrent
Signs of aspiration	Respiratory distress, need for oxygen, chest signs.
High parent or carer anxiety	Parents/carers do not feel happy to take the child home following a full discussion

- Parents of children sent home from A&E with a diagnosis of first simple febrile seizure should be encouraged to contact their own GP or community nurse specialist if they feel they need further information or care (Delphi consensus, no published evidence).
- The guideline developers were unable to reach consensus on what temperature level should define a febrile seizure.

## COMMENTS

The Delphi consensus process is carefully documented, and the guideline methodology ensured that this did not contradict good quality evidence. A panel of parents piloted the patient information literature. The Royal College of Paediatrics and Child Health has appraised the guideline, and disseminated this appraisal to members.

The guideline does not include indications for imaging after a seizure. Although its scope includes children with secondary seizures (for example, following a head injury) and discusses the differential diagnosis, there is no management recommendation for this situation. A recently published

NICE guideline<sup>1</sup> covers the indication for imaging of post-traumatic seizures.

The guideline does not consider the need for medication after a first unprovoked seizure. As the scope includes hospital admission and follow up, its inclusion would have helped to inform these decisions. The recommendation to check anticonvulsant levels was based on evidence that did not specify the anticonvulsants to which this related.

There is an appropriate focus on the recognition, investigation, and diagnosis of bacterial meningitis in children presenting with a febrile convulsion. It is not uncommon to find children having been commenced on acyclovir in case of herpes simplex encephalitis. It would have been valuable to have this management decision included in the scope of the guideline.

The guideline is accessible via the PIER website: [www.pier.shef.ac.uk](http://www.pier.shef.ac.uk).

## REFERENCE

- <sup>1</sup> **National Institute for Clinical Excellence.** *Triage, assessment, investigation and early management of head injury in infants, children and adults.* Guideline 4, June 2003, ISBN: 1-84257-306-3. [www.nice.org](http://www.nice.org).