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Clinical Guideline

Clinical Guideline on Management of Febrile Convulsion

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Explanatory Notes on Level of Evidence

The definition of levels and types of evidence is adapted from the US Agency for Health Care Policy and Research 1992 (AHCPR). This is also recommended and used by the Royal College of Paediatrics and Child Health (RCPCH).

Levels of evidence

Level	*Type of evidence (based on AHCPR 1992)*
Ia	Evidence obtained from meta-analysis of randomised controlled trials
Ib	Evidence obtained from at least one randomised controlled trial
IIa	Evidence obtained from at least one well-designed controlled study without randomisation
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case control studies
IV	Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities

Introduction

Febrile convulsion (FC) is the most common convulsive disorder in children. Those who advocate therapy for FC have been concerned that such convulsion may lead to recurrent febrile convulsions, epilepsy, or perhaps even to brain injury. These concerns indeed also cause a lot of parental anxiety.

The Working Group on Development of Clinical Practice Guidelines of the Hong Kong College of Paediatricians has designated Professor Virginia Wong as the Chairman to recruit panel members to review the literature in order to derive evidence-based recommendations for the management of febrile convulsion.

The Aims are:

1. To improve the paediatric practitioner's understanding of the natural history of febrile convulsion.
2. To provide reasonable guidelines for the management of simple febrile convulsion based on current scientific evidence.

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1) Definition

Febrile convulsion (FC) is defined as convulsion occurring in a child, aged *6 months to 5 years**, associated with fever but without evidence of intracranial infection or defined cause, who is otherwise neurologically normal. Convulsions with fever in children who have suffered a previous non-febrile convulsion are excluded.

- 1.1 "Simple febrile convulsion" is defined as primary generalized convulsion lasting less than 15 minutes and not recurring within 24 hours.
- 1.2 "Complex febrile convulsion" is defined as focal or prolonged (>15 minutes), and/or more than one convulsion in 24 hours.

1.3 "Febrile Status" is a convulsion duration of >30 minutes, either one long lasting convulsion or a series of shorter convulsions, without regaining consciousness interictally.

N.B. 1 Febrile Convulsion should be distinguished from "convulsion with fever", which includes any convulsion in any child with fever of any cause. Thus, children with meningitis, encephalitis, or cerebral malaria do not have febrile convulsions but have convulsions with fever. The same is true for children with severe neurologic disorders and/ or severe mental retardation.

N.B.2 The number of so-called "reflex anoxic convulsions" presenting as febrile convulsions is unknown. It seems to be a syncopal type of anoxic convulsion resulting from vagal-induced bradycardia or asystole with reduced cerebral blood flow. The provoking factor may be fever, thus mimicking a febrile convulsion.

* According to classification of International League Against Epilepsy (1989) – the age was *"1 month" instead of "6 months"*.

2) Acute Management of Febrile Convulsion:

- ❑ Maintain a clear airway.
- ❑ Protect the child from injury.
- ❑ Place the child in a semi-prone position.
- ❑ Loosen clothing or remove excess clothing.
- ❑ Give oxygen if available.
- ❑ Apply suction for nasal or oral secretions if facility available
- ❑ Treat fever by sponging with tepid water and antipyretics (e.g. acetaminophen). ***(Level Ib)***
- ❑ Monitor vital signs.
- ❑ If facilities and medications are available – administer rectal diazepam 0.2-0.5 mg/kg/dose if convulsion lasts for more than 5 minutes. ***(Level IV)***
- ❑ Administer intravenous anticonvulsant if the child is still convulsing for >15 minutes (diazepam, lorazepam or phenobarbital), (preferably in the listed order), and depending on the availability of anticonvulsant.

a. Intravenous **diazepam**, **0.2-0.5** mg/kg/dose (maximum rate: 1-2 mg/minute) to a maximum dose of **2-4** mg in an infant or **5-10** mg in the older child. The same dose can be repeated every 10 to 30 minutes to a total of **3** doses, if necessary.

b. Intravenous **lorazepam**, **0.05-0.10** mg/kg/dose (maximum rate: 1 mg/minute) to a maximum dose of **4** mg can be given; with an additional 0.05 mg/kg 10 minutes later if needed.

c. Intravenous **phenobarbital** in a dose of **15-20** mg/kg (rate: 30 to 100 mg/minute); with half of the initial dose repeated in an hour if necessary. ***(Level IV)***

3) Hospital Admission

Children should preferably be observed for several hours after a febrile convulsion. If they are clinically stable with cause of fever identified and treated, they may be sent home. However, follow-up care must be assured. Hospital admission is individualized. It depends on the experience of the practitioner, specific clinical situation and family circumstances.

- ♦ After a **first** convulsion, the following factors favor admission ***(Level IV)***
  - complex convulsion:
    - ➢ lasting longer than 15 minutes or
    - ➢ with focal features or
    - ➢ repeated in 24 hours of first convulsion or
    - ➢ with incomplete recovery after 1 hour;
  - the paediatrician is suspicious of possibility of meningitis and encephalitis;
  - a child aged <18 months;
  - anxious parents or inadequate home care.

4) Investigations

4.1) Role of Lumbar Puncture (LP)

LP needs to be considered in every child who has a febrile convulsion in whom there is even a small possibility of acute bacterial meningitis. However, most febrile convulsions associated with meningitis are complex. ***(Level IV)***

When to Do a Lumbar Puncture ?

The decision should be taken by an experienced paediatrician who should decide on clinical grounds whether LP is unnecessary for a younger child. In case of

doubt, LP should be performed. If LP is not performed, the paediatrician is advised to review the case within a few hours. A convulsing child who is comatosed should receive neuroimaging before LP. ***(Level IV)***

- ❑ In every child with a first febrile convulsion that is complex.
- ❑ Also, every child <1 year of age with a febrile convulsion should be advised to have a LP, since the clinical signs and symptoms of meningitis may be minimal or absent at this age.
- ❑ Between 12-18 months, LP should be considered because the clinical signs and symptoms of meningitis may be subtle.
- ❑ In a child >18 months, LP should be done in the presence of meningeal signs and symptoms or whenever the history or examination suggests the presence of an intracranial infection.
- ❑ In infants and children with febrile convulsions who have received antibiotic treatment, LP should be strongly considered, since such treatment can mask evidence of meningitis.

4.2) EEG ***(Level IV)***

- EEG is rarely indicated in the management of a simple febrile convulsion.
  [N.B. In 90% of children following a febrile convulsion, an EEG on that day shows slow wave activities which usually disappear by 7 to 10 days.]

4.3) Blood ***(Level IV)***

- In addition to drawing a blood specimen for glucose in a child who is drowsy, if facilities are available, one should obtain toxicology screen, electrolytes and urea.

4.4) Neuroimaging ***(Level IV)***

Neuroimaging is **not** necessary in most cases, but there are exceptions, e.g. in a child with:

- papilloedema,
- cranial nerve palsies (e.g. 6th nerve palsy),
- other persisting focal neurological signs (e.g. hemiparesis) or
- marked depression in mental status, then neuroimaging is probably appropriate.

5) Management of Fever ***(Level Ib)***

- ❑ There is **no** evidence that antipyretic treatment *prevents* the recurrence of febrile convulsions.
- ❑ Fever should be treated in order to promote the comfort of the child and to prevent dehydration.
- ❑ Use of antipyretic drug is effective and paracetamol or ibuprofen is advised. ***(Level Ib)***
- ❑ An adequate fluid intake is advisable.

6) Therapeutic Intervention for Recurrent Febrile Convulsions

6.1) Intermittent Therapy with Diazepam During an Acute Attack

If given in sufficient doses, it is likely to be effective in preventing febrile convulsion recurrence. ***(Level Ib)***

- ❑ **Rectal diazepam** ***(Level IIa)***

- Is advisable for convulsions lasting >5 minutes.
- Parents should be advised not to give rectal diazepam if the convulsion has stopped.
- Rectal diazepam can prevent febrile convulsions when given at the onset of fever. However, this has **not** been studied in a controlled, double-blind fashion, but proven by randomized control trial. ***(Level Ib)***
- Rectal diazepam is useful to prevent a recurrence when used in an early stage of febrile episode (at the time of up-going fever over 38.5°C).

- ❑ **Intermittent diazepam prophylaxis seems to be effective in reducing the recurrence rate provided:** ***(Level Ib)***

- sufficient doses are given
- compliance problems are minimized and very low risk children are left untreated
- **suggested doses for prophylaxis = 0.5 mg/kg administered orally, or rectally every 12 hr whenever the rectal temperature is >38.5°C, with a maximum of 4 consecutive doses to avoid accumulation of the drug.**

[N.B. Side effects of diazepam include ataxia, lethargy and irritability. When children are given intermittent diazepam at the time of fever, one should be alert to monitor the child

regularly in case the underlying infection may be masked due to lethargy from the effect of diazepam.]

6.2) Long-term Anticonvulsant Prophylaxis

- **No** definitive evidence that prophylactic treatment of febrile convulsions with anticonvulsants can prevent later epilepsy.
  There is no prospective study that looked into this important question.
- There had been traditional advocate of using long-term anticonvulsant prophylaxis (phenobarbitone in 1970 or sodium valproate in early 1980s). However, this is currently **not** advised due to side effects. Other anticonvulsants (carbamazepine, phenytoin) are not useful. ***(Level Ia)***
- There is almost universal agreement that long-term anticonvulsant prophylaxis is justified only in highly selected case (based on clinical circumstances and the judgement at the element), if at all, due to side effects.

7) Prognosis

The prognosis of febrile convulsion in terms of intellectual outcome is good. Most children with febrile convulsions do not develop epilepsy. ***(Level IIa)***

Recurrence Risk of Febrile Convulsion ***(Level IIa)***

- Risk of recurrence is 50% if the febrile convulsion occurs in the first year of life.
- Major predictor for recurrence of febrile convulsion is early age of onset.

Risk of Intellectual Deficit ***(Level IIa)***

- Only among those with pre-existing neurological or developmental abnormality.
- And in those who developed subsequent afebrile convulsions.

Risk Factors for Developing Epilepsy ***(Level IIa)***

- Preexisting neurological abnormality.
- Family history of afebrile convulsion.
- Complex first febrile convulsion.

8) Immunization ***(Level IV)***

None of the current standard vaccinations are contraindicated.

DTP

Diphtheria, tetanus, pertussis, and poliomyelitis immunization have already been given to children at 2-4 months. Thus this should be before the usual onset of febrile convulsions. If a child has febrile convulsion before immunization against diphtheria, pertussis, and tentanus due to delay in immunization, the child could be immunized provided the parents have been instructed about the management of fever and the use of rectal diazepam. ***(Level IV)***

MMR

There is no contraindication to Measles, Mumps and Rubella (MMR) vaccination for children with history of febrile convulsion. Parents should be advised about the management of fever after giving MMR vaccination. Keep the child under close observation. Rectal diazepam is recommended to be given in case convulsion lasting >5 minutes occurs. ***(Level IV)***

9) Parental Education

Studies have shown that many parents witnessing a child's first convulsion thinks that their child is dying or is already dead. Try to decrease parental anxiety by counseling. Reassurance and education is thus very important. Instructions on the future management of possible recurrences should be given with emphasis on practical issues of how to manage a child with febrile convulsion at the scene. ***(Level IV)***

Information to be provided to parents:

- Most febrile convulsions have an excellent prognosis.
- Effective therapy to prevent recurrence is available but potential side effects suggest against such prophylaxis.
- No evidence that any therapy will alleviate possibility of future epilepsy.

10) Conclusion

The purpose of this clinical guideline is to provide a medical framework for evaluation and treatment of simple febrile convulsion. In individual cases, the paediatrician's clinical judgement is important to manage the child's clinical condition. Clinical guidelines serve a role in which audit and review of current clinical practice can take place. Updating and revisions of these guidelines are expected in accordance with newer information.

Recommended Checklist for Paediatricians/Family Physicians

- ❑ An accurate description of the convulsion, including its duration
- ❑ Information about the nature of the episode
- ❑ A record about the family history with regard to febrile and non-febrile convulsions
- ❑ The age at first convulsion
- ❑ The temperature on admission
- ❑ Whether signs of meningitis are present or absent
- ❑ An assessment of the cause of the fever
- ❑ The child's neurodevelopmental state when recovered
- ❑ The blood glucose concentration, if the child was seen during a convulsion
- ❑ Other serum chemistries as indicated (electrolytes, calcium)
- ❑ An estimate of the likely prognosis, advice to the parents about what to do if further convulsions occur, and advice about future immunization
- ❑ What the parents were told at admission and before discharge

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