

**GUIDELINE FOR MANAGEMENT OF CHILDREN WITH  
EPILEPTIC SEIZURES IN BRITISH COLUMBIA**

This guideline has been developed by the Division of Neurology at British Columbia's Children's Hospital in collaboration with the Departments of Pediatrics and Psychology and the British Columbia Pediatric Society.

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## 1. ACUTE SEIZURE MANAGEMENT

### 1.1 INITIAL MANAGEMENT OF A CHILD WITH A FIRST SEIZURE SEEN IN PRIMARY CARE OR IN THE EMERGENCY DEPARTMENT

1.1.1 Children who have a first febrile or afebrile seizure and meet one of the following criteria will usually require to be admitted, ideally to an acute pediatric care unit.<sup>1</sup>

#### **Criteria for admission**

Under 1 year of age.

Prolonged (>15 minutes) or recurrent in 24 hours

Glasgow Coma Scale < 15 (or best GCS available for preverbal child)

more than 1 hour after end of seizure

Presenting with any of the following:

    papilloedema, tense fontanelle, or other sign of raised intracranial pressure

    irritable, disinterested, vomiting or generally unwell

    Kernig's sign positive, photophobia, neck stiffness

    respiratory distress, need for oxygen, chest signs

    high parent or care-giver anxiety despite a full discussion

### 1.2 INITIAL TESTS FOR A CHILD PRESENTING WITH AN AFEBRILE SEIZURE

1.2.1 All children presenting with an afebrile seizure should have their blood pressure measured at the time of presentation.<sup>1</sup>

1.2.2 A finger prick blood glucose test should be performed if a child is still seizing or is not fully alert.<sup>1</sup>

1.2.3 An EEG is not required for acute management but may help to determine the cause and risk of recurrence in a child with an afebrile seizure. An EEG should not be ordered following a simple<sup>a</sup> febrile seizure.

1.2.4 No other investigations are routinely indicated if none of the criteria in 1.1.1 are met.<sup>1</sup>

### 1.3 INITIAL TESTS FOR A CHILD PRESENTING WITH A FEBRILE SEIZURE<sup>A</sup>

1.3.1 A child who presents with a seizure and fever and has any of the following on history or examination should be treated as for bacterial meningitis and herpes simplex encephalitis until proven otherwise.<sup>2,3,1</sup>

- Not responding normally, e.g., drowsy or irritable prior to seizure
- Neck stiffness or other meningeal sign
- Petechial rash
- Bulging fontanelle
- Glasgow Coma Scale < 15 (or best GCS available for preverbal child) more than 60 mins after the seizure stops

1.3.2 All children under 12 months with a first febrile seizure should have a lumbar puncture done to exclude meningitis unless there is a contraindication to lumbar puncture or an experienced physician has excluded this diagnosis.<sup>4</sup>

1.3.3

A lumbar puncture should be considered strongly in a child between 12 and 18 months and in a child who has received prior antibiotic treatment

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- 1.3.4 because the clinical signs and symptoms of meningitis may be absent in this group.
- 1.3.5 No other laboratory investigations are required in a child who has a simple febrile seizure. However, where no source of infection has been found clinically, the child should be investigated as for an infant with fever.
- EEG and brain imaging are not indicated in a child who has a simple febrile seizure.

## 1.4 MANAGEMENT OF PROLONGED OR SERIAL SEIZURES

### Definitions

- **status epilepticus** = a single epileptic seizure lasting more than 30 minutes **or** recurrent epileptic seizures without recovery of consciousness lasting more than 30 minutes. A child who has been seizing for > 5 minutes when seen in the ER should be treated as for status epilepticus.
- **refractory status epilepticus** = status epilepticus not responding to benzodiazepine therapy and phenytoin

- 1.4.1 Status epilepticus should be treated with intravenous lorazepam (0.1 mg/kg to a maximum of 4 mg per dose) or intravenous diazepam (0.3 mg/kg to a maximum dose 5 mg in infants and 10 mg in older children). Diazepam should be given slowly over 2 - 5 minutes.
- 1.4.2 Intravenous phenytoin (18-20 mg/kg to a maximum of 1000 mg per dose over 20 minutes) should be administered following the benzodiazepine unless the seizure has lasted less than 10 minutes or the seizure was with fever and stopped after benzodiazepine was given.
- 1.4.3 When intravenous access is not achieved rapidly, rectal diazepam (0.5 mg/kg to a maximum of 10 mg per dose)<sup>6,7,8</sup>, or buccal or intranasal midazolam (0.2mg/kg of 0.5% to a maximum of 20mg)<sup>9,10</sup> may be given whilst intravenous access is being achieved.
- 1.4.4 If intravenous access is not achieved rapidly, phenytoin (18-20 mg/kg in normal saline to a maximum of 1000 mg per dose) should be administered
- 1.4.5 by the interosseous route.
- 1.4.6 A child in refractory status epilepticus should be admitted to an intensive treatment unit.
- 1.4.7 Electrical status epilepticus occurs commonly after the clinical status is controlled. Many of these children will exhibit subtle motor
- 1.4.8 movements but these may be absent. An EEG should be performed acutely in a patient in whom the mental state does not recover at the expected rate.
- 1.4.9 Paralysis of the patient is often used to assist in airway control but its use is complicated by loss of clinical signs. Such patients should ideally have continuous EEG monitoring. Repeated EEGs are the next best option where EEG monitoring is unavailable.
- 1.4.10 Refractory status epilepticus should be treated with either intravenous midazolam or phenobarbital where the patient can be intubated. Midazolam (0.1 mg/kg loading dose to a maximum of 8 mg over 2 - 3 mins.) is followed by infusion starting at 2 **micrograms**/kg/min and increasing up to 24 **micrograms**/kg/min depending on clinical response.

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1.4.11 Phenobarbital (15-20 mg/kg) is administered over 5 mins<sup>11,12</sup>. Where there is concern about intubation, rectal paraldehyde (0.3 ml/kg to a maximum of 10 mls plus an equal volume of mineral oil) may be given.

1.4.12 The following tests should be considered in children who present with a first episode of status epilepticus: glucose, blood gases, renal function, electrolytes, liver enzymes, calcium levels, magnesium levels, complete blood count, blood clotting studies and anticonvulsant levels.

1.4.13 Toxicology testing should be considered in children when no apparent etiology is identified<sup>15</sup>.

Neuroimaging should be considered if there are clinical indications or if the etiology is unknown but should only be performed after the child is appropriately stabilized and the seizures controlled<sup>15</sup>.

Empiric meningitic doses of antibiotics and antivirals should be considered after blood is taken for culture in the febrile patient with first seizure presenting as status epilepticus where the aetiology is not identified.

All Emergency Departments, Intensive Care Units and Pediatric Units that admit children should have a protocol for the management of convulsive status epilepticus readily available.

Management of children with non-convulsive status epilepticus and refractory status epilepticus is complex and should be discussed with a pediatric neurologist or intensivist at Children's Hospital (604 875 2161).

## 1.5 INDICATIONS FOR EMERGENCY IMAGING

1.5.1 Emergency imaging (CT or MRI) should be performed on all children with new-onset seizures in whom a serious underlying structural abnormality is suspected. The following clinical findings may suggest such a possibility:

- focal neurological sign persisting for > 1 hour following the seizure,
- persistent altered mental status,
- recent trauma,
- persistent or increasing headaches,
- history of cancer,
- history of treatment with anticoagulation or acquired immune deficiency syndrome<sup>13,14</sup>

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## 2. DIAGNOSIS AND INVESTIGATION

### 2.1 DIAGNOSIS

- 2.1.1 | The diagnosis of epilepsy should be made by a physician with expertise in childhood epilepsy<sub>1,2,3</sub>
- 2.1.2 | An accurate history should be taken from both a first-hand witness and the child<sub>1</sub>

### 2.2 ELECTROCARDIOGRAPHY (EKG)

- 2.2.1 | An EKG with calculation of the QTc interval should be considered in a child presenting with a convulsive seizure if the etiology or the syndromic diagnosis is not clear.

### 2.3 HOME VIDEO RECORDING

- 2.3.1 | Home video camera recordings can be extremely useful if they capture recurrent events where diagnosis is in doubt<sub>1,5</sub>

### 2.4 ELECTROENCEPHALOGRAPHY (EEG)

- 2.4.1 | The recording and interpretation of a pediatric EEG should be undertaken by a department familiar with childhood epilepsy and whose expertise is verified by regular audit and review<sub>1</sub>
- 2.4.2 | An EEG in a child should ideally be performed when the child is sleep deprived, with the aim of achieving a recording during sleep. Epileptiform abnormalities are more common in both the sleep-deprived state and in sleep<sub>6,7,9,10,11,12</sub>
- 2.4.3 | An EEG is not indicated in patients with a characteristic history of syncope or breath holding spells.
- 2.4.4 | An EEG is not indicated in children with simple febrile seizures<sub>13</sub>
- 2.4.5 | An EEG should be performed in a child who has a definite nonfebrile seizure (Hirtz et al 2000). The EEG may be helpful in assessing recurrence risk<sub>8</sub>, making a syndromic diagnosis, and identifying etiology, and can assist in drug selection.
- 2.4.6 | The following medications may influence the epileptiform abnormalities on an EEG and may mask a syndromic diagnosis:- benzodiazepines<sub>14</sub>, valproic acid, divalproex sodium<sub>15,16</sub>, ethosuximide, lamotrigine, levetiracetam, topiramate
- 2.4.7 | Video-EEG or ambulatory EEG monitoring may help to distinguish between
- 2.4.8 |

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epileptic and non-epileptic seizures<sup>17,18,19,20,21</sup> Such children should be referred to Children's Hospital.

EEG abnormalities by themselves should not be used to make a diagnosis of epilepsy. Certain genetic epileptiform abnormalities (e.g. spike and wave or photosensitivity) are observed in up to 4% of children without epilepsy.

## 2.5 BRAIN IMAGING

- 2.5.1 Neuroimaging should be considered in all children who have more than one afebrile epileptic seizure except where the clinical and EEG features are consistent with an idiopathic epilepsy, e.g. childhood or juvenile absence epilepsy, juvenile myoclonic epilepsy, benign rolandic epilepsy.
- 2.5.2

- 2.5.3 An MRI is the preferred modality (Hirtz et al 2000) and should be considered if the child is older than two years of age. The availability of MRI and the necessity for sedation in the young child are factors that may influence the selection of CT or MRI.

Emergency CT head scan should be considered in a child with one of the following (Hirtz et al 2000).;

- a first episode of non-febrile status epilepticus,
- a prolonged postictal focal deficit (Todd's paresis) that is not recovering within several hours,
- if the child's condition has not returned to baseline within several hours after the seizure

## 2.6 LABORATORY TESTING

Routine measurement of haematology and biochemical parameters are not indicated in the assessment of a first epileptic seizure. Laboratory tests should be based on the clinical condition of the child, e.g., vomiting, dehydration etc.

Toxicology testing should be considered across the pediatric age range if there is any question of drug exposure or substance abuse.

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## 2.7 GENETICS

- 2.7.1 In all patients with newly diagnosed epilepsy, a three generation family history should be taken (i.e. siblings, parents, grandparents, uncles, aunts and cousins). Parents may not be aware initially of a family history of epilepsy and should be encouraged to ask the grandparents about other family members about the possibility of a family history for seizures.

## 2.8 PYRIDOXINE-DEPENDANT SEIZURES

- 2.8.1 Pyridoxine dependant epilepsy is a rare but treatable form of epilepsy. It typically presents in the neonatal period and early infancy but can manifest up to 3 years of age. A trial of oral pyridoxine should be considered in children with intractable epilepsy with onset under the age of 3 years. Neonates and young infants with pyridoxine dependency may become apneic following intravenous pyridoxine. Consequently, a trial of intravenous pyridoxine should only be performed in a setting where the child can be intubated immediately. In patients who respond to pyridoxine, specific biochemical and genetic testing can be performed by the Division of Metabolic Diseases at BCCH.

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### 3. REFERRAL PRINCIPLES

#### 3.1 GENERAL PRINCIPLES

- 3.1.1 | All children with epilepsy should be referred to a pediatrician or pediatric neurologist.
- Children with more severe epilepsy should normally be evaluated in a tertiary epilepsy program.

#### 3.2 REFERRAL TO A PEDIATRICIAN

- 3.2.1 | A child with a first probable afebrile seizure should be able to see a pediatrician within 2 weeks of referral.

#### 3.3 INDICATIONS FOR REFERRAL TO A PEDIATRIC NEUROLOGIST

- 3.3.1 | Referral to a pediatric neurologist should be considered in the following situations:
- when there is doubt about the diagnosis of epileptic seizure
  - children with infantile spasms
  - children with multiple seizure types who do not respond clinically and electrically to the first treatment
  - children with suspected non-epileptic seizures

#### 3.4 INDICATIONS FOR REFERRAL TO CHILDREN'S HOSPITAL EPILEPSY PROGRAM

- 3.4.1 | The Epilepsy Program provides specialized treatments including epilepsy surgery, vagal nerve stimulation, the ketogenic diet, investigational drugs, and counseling in epilepsy genetics. The management of the child should also involve the referring pediatrician and/or neurologist: Children in the following situations should normally be evaluated in the epilepsy program and a management strategy developed:
- 3.4.2
- when two appropriate AEDs have been tried without success
  - a child with epilepsy who has a focal brain lesion that might be the cause of the seizures and amenable to surgical treatment
  - when there may be an epileptic encephalopathy as evidenced by slowing in development associated with onset of the epilepsy
  - particular etiologies or syndromes
    - o hemimegalencephaly, Sturge-Weber syndrome, Rasmussen's encephalitis
    - o hypothalamic hamartoma
    - o Landau-Kleffner syndrome or continuous spike wave in sleep

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### 4. MANAGEMENT AND TREATMENT

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#### 4.1 EPILEPSY EDUCATION OF CHILDREN, YOUNG PEOPLE AND THE FAMILY

- 4.1.1 All children with epilepsy and their family<sup>b</sup> should be given information relevant to their epilepsy and the medication they are receiving<sup>1,2</sup>; The B.C. Epilepsy Society has detailed information sheets in several languages (www.bcepilepsy.com).
- 4.1.2 The use of a checklist (See Appendix A) can help healthcare professionals ensure that they provide all appropriate information to the child and family. The process of educating the family is often
- 4.1.3 best done over several sessions.
- 4.1.4 Families should be given information to take home (in their first language if possible). This should include information sheets and selected websites.
- 4.1.5 Epilepsy education should be repeated over time and understanding assessed
- 4.1.6 Children with epilepsy should be enabled to participate in the full range of school activities with appropriate supervision.
- 4.1.7 The management of children who have frequent seizures or who have seizures that require intervention is made easier when a written care plan is provided to the school and family
- Epilepsy awareness training and written information should be offered to schools. This can be arranged by contacting the B.C. Epilepsy Society (604 875 6704)

#### 4.2 MANAGEMENT OF RISK

- 4.2.1 Children with epilepsy should be encouraged to participate in normal activities with their peers. Supervision requirements should be individualized, taking into consideration the type of activity and the seizure history
- 4.2.2 Children and families should be advised of the risk of drowning and the need for appropriate supervision both in the home and when swimming.
- 4.2.3 The risk of sudden unexpected death in children with epilepsy (SUDEP) is very small, particularly in children who have no other neurological abnormality<sup>c</sup>. It has been estimated to be 2 - 4 per 10,000 person-years. Marked immobility due to a severe motor abnormality, e.g., spastic quadriplegia, is a major risk factor. Onset of seizures before 1 year of age, generalized tonic-clonic seizures and difficulty achieving seizure control are seizure-related factors considered to increase the risk of sudden unexpected death in epilepsy in children. These risk factors should be discussed in a sensitive manner with the parents and caregivers of the child with epilepsy who is at particular risk.

#### 4.3 STARTING ANTIPILEPTIC TREATMENT

<sup>b</sup> The term family is used to include other unrelated caregivers.

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- 4.3.1 Children with febrile seizures, even if recurrent, are not usually treated prophylactically with antiepileptic drugs<sup>7</sup>.
- 4.3.2 Long-term prophylactic antiepileptic drug treatment following head injury does not decrease the risk of post-traumatic epilepsy<sup>8</sup>.
- 4.3.3 Antiepileptic drug treatment is not usually started after a first unprovoked partial or tonic-clonic seizure<sup>9,10</sup>.
- 4.3.4 The decision to commence therapy should be reached jointly following discussion between a physician with expertise in epilepsy and the child and family. It should be informed by a knowledge and understanding of the epilepsy syndrome and an assessment of the risk of a seizure recurrence.
- 4.3.5 The overall risk of a further seizure is 50% in a child with a first afebrile seizure and 80% in a child following a second afebrile seizure. Factors known to increase that risk are a) partial seizure; b) seizure during sleep; c) abnormal neurological development prior to 1<sup>st</sup> seizure; d) history of previous neurological injury; e) epileptiform EEG; f) history of epilepsy in 1<sup>o</sup> relative (but only in those with epileptiform EEG).
- 4.3.6 Other factors that may influence decision to treat after a first seizure include:
- Initial seizure was status epilepticus
  - EEG demonstrates absence or myoclonic seizures not reported by family
  - Child or family find risk of a further seizure unacceptable
- 4.3.7
- 4.3.8 Factors that may influence the selection of an antiepileptic drug include seizure type, epilepsy syndrome, potential adverse effects, cost and comorbidities, e.g., obesity (valproate), underweight (topiramate), behaviour difficulties (Phenobarbitone, benzodiazepines, topiramate, levetiracetam), learning difficulties (topiramate, phenobarbitone), drooling (clonazepam, nitrazepam).
- 4.3.9 If the seizures do not respond to a medication, the following possibilities should be considered:-
- Is the diagnosis of epilepsy correct?
  - Is the choice of AED appropriate for the epilepsy syndrome and/or seizure type?
  - Was the child prescribed an adequate dose and appropriate formulation? Measurement of level may be useful.
  - Did the child take the treatment as prescribed? Measurement of level may be useful.
- Combination therapy should normally only be considered when there has been an adequate trial of monotherapy <sup>22-37</sup>

#### 4.4 EFFICACY OF ANTIEPILEPTIC DRUGS

- 4.4.1 Most studies of antiepileptic drugs have been based on seizure type rather than epilepsy syndrome or etiology. Those studies that have compared efficacy between antiepileptic drugs for partial (with and without generalization) and tonic-clonic seizures have not demonstrated a significant difference (Marson Epilepsia 2002).
- 4.4.2 The following drugs (**listed alphabetically**) have been shown to be effective in children with partial seizures:-
- carbamazepine, clobazam, lamotrigine, levetiracetam, oxcarbazepine, phenobarbitone, phenytoin, topiramate, valproic acid, vigabatrin
- 4.4.3

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The following drugs have been shown to be effective in children with generalized-onset tonic-clonic seizures:-

- 4.4.4
- carbamazepine, clobazam, phenobarbitone, lamotrigine, levetiracetam, phenytoin, topiramate, valproic acid

The following drugs have been shown to be effective in children with myoclonic seizures:-

- 4.4.5
- clonazepam, ethosuximide, levetiracetam, topiramate, valproic acid, acetazolamide

The following drugs have been shown to be effective in children with children with absence seizures:-

- 4.4.6
- clonazepam, ethosuximide, lamotrigine, valproic acid
- 4.4.7
- Ethosuximide has been demonstrated to be more effective than valproic acid and lamotrigine

The following drugs have been shown to be effective in children with infantile spasms without tuberous sclerosis:-

- ACTH<sub>12,13</sub>, vigabatrin

For children with infantile spasms and tuberous sclerosis:-

- 4.4.8
- vigabatrin<sub>14,15</sub>

Antiepileptic drugs may occasionally increase seizure frequency in certain epilepsy syndromes or seizure types<sub>17-21</sub>:-

<u>Antiepileptic drug</u>	<u>Syndrome/seizure type that may be worsened</u>
carbamazepine, vigabatrin, tiagabine, phenytoin, gabapentin	childhood and juvenile absence epilepsy, juvenile myoclonic epilepsy <sub>16,17</sub>
vigabatrin	absence seizures and absence status <sub>16</sub>
clonazepam	generalized tonic-status <sub>18</sub>
lamotrigine	Dravet's syndrome <sub>19</sub> , juvenile myoclonic epilepsy <sub>20,21</sub>
carbamazepine	benign rolandic epilepsy <sub>17</sub>

#### 4.5 ADVERSE EFFECTS OF ANTIEPILEPTIC DRUGS

4.5.1 The potential adverse effects of a prescribed medication and management of these side-effects should be discussed with children and their parents.

4.5.2 The child and family should be informed of the risk of all serious idiosyncratic effects, e.g., Stevens-Johnson syndrome, hepatotoxicity and pancreatitis, the degree of the risk, and what clinical features they should monitor.

4.5.3

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- 4.5.4 The child and family should be informed of the common reversible dose-related effects, e.g., diplopia, ataxia, and should be supplied with an information sheet on that drug.
- 4.5.5 Women receiving an enzyme-inducing antiepileptic medication, such as carbamazepine, phenytoin, phenobarbital, primidone, oxcarbazepine and topiramate, have at least a 6 percent failure rate per year for oral hormonal contraceptive pills. Most commonly used oral contraceptives contain 35 mcg or less of estrogenic compounds and may be ineffective in women who take the above drugs. Subdermal levonorgestrel implants (Norplant) are also less effective in women receiving enzyme-inducing antiepileptic drugs. Women taking enzyme-inducing antiepileptic drugs should use nonhormonal methods of contraception or receive contraceptives containing 50 mcg or more of the estrogenic component. Alternatively, antiepileptic drugs that do not induce significantly liver enzymes, such as levetiracetam, lamotrigine, tiagabine and valproate, may also be an option in some patients. If the patient develops mid-cycle bleeding, consider using nonhormonal methods of contraception or contraceptives containing 50 mcg or more of the estrogenic component.
- 4.5.6
- 4.5.7 Adolescent girls taking AEDs and their parents should be advised of the risks of fetal malformations, developmental delay and intrauterine death associated with taking the medications they are receiving during pregnancy
- Valproic acid should be used with caution in females of reproductive age because of the increased risk of fetal death and malformation associated with taking this drug during pregnancy<sup>38</sup>.
- All women on AED who consider there to be a possibility of pregnancy should be advised to take a daily dose of folic acid from pre-conception until the end of the first trimester.<sup>39-40</sup> A dose of at least 0.4 mg/day of folic acid is recommended<sup>40</sup> and one study demonstrated a reduction in major congenital malformations when a dose of 2.5 to 5 mg/day<sup>41</sup>.

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#### 4.6 ANTIEPILEPTIC DRUG MEASUREMENT

- 4.6.1 Routine AED level monitoring is generally not indicated in children except for phenytoin. The pharmacokinetic properties of phenytoin are complex and toxicity may occur following a change of dose, or intercurrent illness, or when another drug is added or withdrawn. In addition, toxicity may be asymptomatic.
- 4.6.2 Measurement of levels of the following drugs can sometimes be of value in the management of epilepsy: carbamazepine, ethosuximide, phenytoin,
- 4.6.3 phenobarbital and valproic acid
- 4.6.4 Measurement of an AED level should be carried out only if there is a clinical question.
- Indications for monitoring AED levels:-
- a) suspected non-adherence to the prescribed treatment
  - b) suspected toxicity
  - c) adjustment of phenytoin dose
  - d) management of pharmacokinetic interactions
  - e) specific clinical conditions (e.g. status epilepticus, organ
- 4.6.5 failure)
- f) if using doses of medication above the recommended dosage
  - g) if child is severely mentally challenged and clinical assessment of toxicity is difficult
- Routine measurement of blood count and liver enzymes is not recommended in children receiving antiepileptic drugs.

#### 4.7 ANTIEPILEPTIC DRUG WITHDRAWAL

- 4.7.1 The decision to withdraw medication in children who had seizures after the neonatal period should be taken by the child, family and the specialist after a full discussion of the risks and benefits of withdrawal. The discussion should include the child's risk of seizure recurrence, the impact of seizure recurrence, e.g. in a child with a history of status epilepticus, and consider the epilepsy syndrome, prognosis and
- 4.7.2 lifestyle<sup>42,43</sup>
- Withdrawal of antiepileptic drug treatment should normally be considered in children whose seizures were controlled relatively easily and have been seizure free for 2 or more years<sup>44</sup>. However, this decision should be based on an understanding of factors that may increase significantly the risk of
- 4.7.3 recurrence, e.g. certain epilepsy syndromes such as juvenile myoclonic epilepsy, epileptiform abnormalities on EEG, when seizure control had been difficult to achieve, and symptomatic epilepsy.
- 4.7.4 Withdrawal of AEDs should usually be managed by, or with input from, a physician with expertise in epilepsy.
- Withdrawal of AEDs should occur gradually (over 2-3 months or longer) except where the patient is suspected to have a serious idiosyncratic reaction, e.g. Stevens-Johnson syndrome, when the drug should be stopped immediately.
- 4.7.5 It may be helpful in such situations to contact a Children's Hospital neurologist.
- 4.7.6
- 4.7.7 The child and family should be informed of the potential for withdrawal symptoms, including withdrawal seizures and status epilepticus, that may occur particularly with certain drugs, e.g., benzodiazepines, phenobarbital, acetazolamide.
- 4.7.8

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Only one drug should normally be withdrawn at a time.

A plan of action for what to do if the seizures recur should be agreed with the child and family, e.g., last dose reduction reversed, medical help sought, etc.

Young people who are driving a motor vehicle and whose medication is being withdrawn should be warned that they are at higher risk of a seizure occurring. They must not drive until they have remained free of seizures for three months from the date of discontinuation.

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## 5. BEHAVIOUR AND LEARNING

### 5.1 GENERAL PRINCIPLES

- 5.1.1 All children with epilepsy should have their behavioral and academic progress reviewed on a regular basis by the epilepsy team
- 5.1.2 Children with academic or behavioral difficulties should have appropriate education and/or psychological assessment and intervention
- 5.1.3 If cognitive or behavioural abnormalities are considered to be adverse effects of a specific AED, the medication dosage should be adjusted or an alternative drug should be considered.
- 5.1.4
- 5.1.5 A child with epilepsy who shows cognitive or behavioural regression that is not clearly related to the medication should have an EEG performed; if this demonstrates frequent inter-ictal EEG changes, the child should be referred to a tertiary centre and seen as a priority.  
A child with epilepsy who shows cognitive or behavioural regression that is not clearly related to the medication should have a psychological assessment to examine cognitive function and psychosocial factors that may play a role.

### 5.2 EPILEPSY AND THE USE OF OTHER MEDICATIONS

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- 5.2.1 | Epilepsy and the treatment of seizures are not contraindications to the use of neurostimulant medication in most children. The clinical response to neurostimulant medication should be monitored carefully in children with epilepsy and ADHD(2-7)
- 5.2.2 | Epilepsy and the treatment of seizures are not contraindications to the use of melatonin for the treatment of sleep disorders in children and young people(8-11)
- 5.2.3 | Epilepsy and the treatment of seizures are not contraindications to the use of selective serotonin reuptake inhibitors and atypical neuroleptics such as risperidone. The clinical response to such medication should be monitored carefully in children and young people with epilepsy and associated behavioral and psychiatric disorders. The physician should be aware of the drug interactions between some antiepileptic drugs, including carbamazepine, phenytoin, phenobarbital and valproate, and some of the antipsychotic medications (12)

### 5.3 MANAGEMENT OF CHILDREN WITH LEARNING DISABILITIES AND EPILEPSY

- 5.3.1 | Learning disabilities are common in children with epilepsy. Children with epilepsy who are having educational difficulties should have a psychologic assessment to determine the cognitive and psychosocial factors that may be contributing to their difficulties.
- 5.3.2 | Children with epilepsy who are having educational difficulties should receive the same support and care for their educational difficulties as the general population. This will include the involvement of a learning disabilities team
- 5.3.3 | Particular attention should be paid to the possible adverse cognitive and behavioral effects of AED therapy In individuals with learning disabilities and epilepsy.

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