**Incidence**

The prevalence of epilepsy is 0.5%. Many more children will have an isolated seizure.

A seizure should always be considered a symptom. The history, examination and any investigations should focus on identifying the presence of underlying pathology or provoking factors and assessing the risk for future seizures.

**All Children Require**

1. Detailed history obtaining the sequence of events, including the presence or absence of focal features and the level of awareness throughout the seizure. Consider arrhythmic cause for generalized seizures especially occurring at night or during or following exercise.

2. Family history of evidence of young sudden death, familial epilepsy or arrhythmic disorders.

3. Detailed physical examination, including BP and neurological examination.

4. Blood glucose and calcium measurement.

5. Neuro-imaging is not usually required acutely. Imaging should be considered for focal seizures or when focal deficits are noted on examination or EEG suggests underlying structural pathology.

6. A 12 lead ECG for evidence of long QT syndrome (not needed for focal seizures).

7. An EEG (as an outpatient) is recommended after the first non-febrile generalised tonic clonic seizure.
   - **If the EEG is normal the risk of recurrence within the next 12 months is about 15% but if it is abnormal the risk of recurrence is about 40%.**

8. Outpatient follow-up.
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Management

1. Explanation of risk of recurrence

2. All caregivers need to know the principles of first aid management:
   - The child should be laid on the floor away from objects that may cause harm
   - Forceful attempts should not be made to open the child’s mouth
   - Phone for ambulance if seizure lasts longer than 5 minutes
   - Place in left lateral (recovery) position during post ictal period

3. Reasonable precautions to be discussed with caregivers include:
   - Supervision by an adult when the child has access to water (this includes bathing)
   - Avoid bike riding in heavy traffic
   - Not climbing to heights greater than one metre.

4. Usually long term treatment with an anti-convulsant is not indicated after the first non-febrile seizure

5. Discuss the use/ need for emergency medication

   a. Rectal diazepam
      0.3-0.5 mg/kg/dose. (max dose usually 10mg) Onset of action 5-10 mins.
      Dose may only be repeated under medical supervision.
      Delayed respiratory depression may occur after rectal administration.

   b. Buccal midazolam
      - 0-16kg: Dose of 0.2 to 0.3 mg/kg/dose
      - 16 – 32 kg: Dose of 5mg
      - 32kg+: Dose of 10mg

See Appendix 1 for a Plan for Emergency Management of Seizures using rectal diazepam (Stesolid).

See Appendix 2 for Caregivers guide to administering buccal midazolam.

Recurrence Risk

The recurrence rate after a child’s first afebrile seizure is 30%. This is increased in children with neurological disabilities. Following a second afebrile seizure the risk of recurrence is considerable higher, approximately 75%

The EEG is helpful in predicting the risk of recurrence.
Indications for Starting Therapy

Anticonvulsants are not indicated after the first seizure. Some authorities consider starting anticonvulsant therapy after a single seizure if there is a family history of epilepsy, or in the presence of neurological or developmental abnormalities. There is no evidence that delaying therapy until after the second seizure is associated with poorer control of seizures in the long term.

Starting Anticonvulsant Medication

The drug of choice is determined by the seizure type or most likely seizure syndrome. A history of the seizure, detailing the sequence of events, including the presence or absence of focal features and the level of awareness throughout the seizure is therefore very important.

The anti epileptic drug commenced should be decided upon the physician providing ongoing follow-up. Prescribers should be aware of side effects of any medications prescribed. The two most commonly prescribed first line anticonvulsant medications are carbamazepine (Tegretol) and sodium valproate (Epilim). Important side effects to be aware of include liver dysfunction, bleeding, fetotoxicity / teratogenicity (Epilim) and rash. Anticonvulsants are rarely associated with Steven's Johnson Syndrome (SJS), and medication should be discontinued if a rash develops. The risk of SJS in patients on carbamazepine is slightly higher among Asian patients; particularly descendants of Han Chinese.

Both drugs should be commenced at low doses building to therapeutic doses over 2-3 weeks. This reduces the risk of adverse side effects.

Carbamazepine.
Maintenance doses should be between 15-20 mg/kg/day.

This should be started gradually as follows:
- 5 mg/kg/day in two divided doses for seven days
- Then 10 mg/kg/day in two divided doses for seven days
- Then 15 mg/kg/day in two divided doses for seven days

The usual maximum is 1200 mg/day in up to three divided doses.

One month after starting carbamazepine check the full blood count and platelet count, liver function tests and drug levels.
Sodium Valproate.
Maintenance dose are usually 20 – 30 mg/kg/day

This should be started gradually as follows:
- 5 mg/kg/day in two divided doses for five days
- Then 10 mg/kg/day in two divided doses for five days
- Then 15 mg/kg/day in two divided doses for five days
- Then 20mg/kg/day in two divided doses for five days

FBC and LFTs should be checked prior to starting treatment and at one month. There is usually no benefit in monitoring Epilim levels. Epilim levels may be useful if you suspect poor adherence to therapy or toxicity.

See separate pdf file called Kids & Epilepsy Kit (for a package of parent information leaflets prepared by The Child Neurology Department Christchurch Hospital. This includes information on epilepsy, EEGs, MRIs and several different anti-convulsants.

See Appendix 3 for a blank Medication Dosing Schedule you can fill in for your patients when starting or changing medication.

Criteria for referral to Neurology

Referral to neurology should be considered for the following:
- When there is diagnostic doubt as to the nature of the seizures and/or seizure syndrome (also consider arrhythmic collapse as a possible cause and consider referral to cardiology)
- Behavioural or developmental regression
- When seizures are not controlled within 2 years or failure of second antiepileptic drug
- New onset seizures in a child < 6 months
- Infantile spasms
- Structural lesion on imaging
- Individuals with specific syndromes such as Sturge-Weber syndrome, Tuberous Sclerosis Rasmussen’s encephalitis and hypothalamic hamartoma
- Psychchological or psychiatric co-morbidity
- Unacceptable side effects on medication
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Useful links

- Starship neurology supports the NICE guidelines Starship neurology supports the NICE guidelines "The epilepsies: diagnosis and management of the epilepsies in children and young people in primary and secondary care" Oct 2004 (www.nice.org.uk/guidance/index.jsp?action=download&o=29530)

- Epilepsy NZ (www.epilepsy.org.nz)

- See separate pdf file (www.starship.org.nz – Health Professionals – Clinical Guidelines) called Kids & Epilepsy Kit for a package of parent information leaflets. This is reproduced with the permission of Dr Paul Shillito, the Child Neurology Department at Christchurch Hospital and GSK. This includes information on epilepsy, EEGs, MRIs and several different anti-convulsants.

References

5. CG20 Epilepsy in adults and children: NICE guideline; 27 October 2004
Appendix 1 – Plan for Emergency Management of Seizures using rectal diazepam (Stesolid).

Date:

Dr………………………………………

EMERGENCY MANAGEMENT OF SEIZURES

Most seizures last less than 2 minutes. Seizures lasting less than 1 hour are unlikely to cause any harm. Seizures lasting more than 1 hour may cause further brain damage. It is therefore important that seizures lasting more than 1 hour be stopped by treatment in hospital. You should take the following steps if your child has a seizure.

1. For all seizures resulting in loss of consciousness, the child should be placed in the recovery position until the seizure stops. No attempt should be made to insert anything into the mouth.

2. If a seizure lasts for more than 5 minutes, ….mg Stesolid rectal tube should be administered. The plastic cap is removed from the end of the tube which is gently inserted into the anus, the contents of the tube are squeezed into the rectum (back passage).

3. If the seizure does not stop within a further 10 minutes, no further Stesolid should be administered, but an ambulance should be called so that your child can safely be transported to hospital for appropriate treatment.

4. If your child has a further long seizure, the Stesolid may be repeated after an hour has elapsed from the first dose, but no more than three doses of Stesolid should be given in 24 hours without seeking medical advice.

5. A series of short seizures, in which your child does not return to his normal level of activity and consciousness in between seizures, should be treated in the same way as one long seizure.

6. After a seizure has stopped, your child may wish to lie down and sleep for a period of 1-2 hours. If there is no ongoing seizure activity, you should not be alarmed by this but should supervise your child until your child wakes up. He/she should be placed on his/her front with the head to one side at this time.
Your Doctor has prescribed your child with a preparation of **buccal or intranasal midazolam** for the purpose of **status epilepticus** (*prolonged generalised seizure*).

### WHEN DO I USE IT?

- If your child has a seizure resulting in loss of consciousness and lasting more than 5 minutes, you will need to give your child a dose of buccal midazolam.
  
  or

- If your child has re-occurring seizures;
  - they do not recover between seizures,
  - or
  - they have more than ____ seizures in a ____ hour period.

### WHAT WILL I NEED TO DO?

Once you have determined that your child requires midazolam, you will need to place the child on his/her side (in the recovery position as per the illustration). Remember to check the ampoule first for name of medication, dose and expiry date before administration.

**Each plastic ampoule of midazolam is contains 15 mgs of midazolam in 3mls.**

- Twist open the midazolam ampoule. Using a syringe draw up ____ mls (____ mgs).
  Gently insert the syringe into the buccal cavity of the mouth, inside of the lower cheek and the teeth.

- Gently tilt the head back so your child is in a comfortable position. If necessary place your hand under your child’s jaw to ensure the medication doesn’t spill out.

- **Be sure to take your time - over 30-60 seconds is ideal.**
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WHAT DO I NEED TO DO NEXT?
After giving the Midazolam, if the seizure (fit) does not stop in 10 minutes ring for an ambulance, phone 111.

Stay with your child for at least an hour.

Watch for difficulties with breathing.
- Slow breathing or Shallow breathing

Ensure the child is left on his/her side until they are fully recovered. Ring the child’s caregiver. Phone ________________

If you are concerned or experience any difficulties call an ambulance. phone 111

- If your child has a further long seizure, administration of midazolam may be repeated after one hour has elapsed from the first dose, but no more than two doses of midazolam should be given within 24 hours without first seeking medical advice.

- After a seizure has stopped, your child may wish to lie down and sleep for a period of 1-2 hours. If there is no ongoing seizure activity, you should not be alarmed by this but should supervise your child until your child wakes up. He/she should be placed on his/her front with the head to one side at this time.

Dr ______________________________   DATE ________________

Contact details

Ambulance service / emergency services   phone 111

Family doctor    Dr __________________   phone ________________

Other
__________________________________________________________________________
__________________________________________________________________________

phone ________________

Child’s Usual Consultant / Paediatrician
Dr __________________________
## Appendix 3: Medication Dosing Schedule

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