

SEIZURES AND STATUS EPILEPTICUS - MANAGEMENT

PRACTICE GUIDELINE[®]

DOCUMENT SUMMARY/KEY POINTS

- Seizures are a common neurological disorder in infants and children and can occur with a wide variety of conditions that involve the central nervous system.
- They occur as a result of abnormal discharges of electrochemical activity in the brain, and manifestations include a loss of or altered consciousness, involuntary movements, and changes in perception, behaviours, sensations and postures.
- **This document is not a guideline for management of seizures in neonates.**
- Most seizures are brief, terminate spontaneously and don't require immediate medical intervention.
- Patient safety must always be the priority in the care of children who experience seizures. Vigilant observation is required at the time of seizure activity.
- **Status epilepticus is a medical emergency requiring an emergency response. Escalation of care should adhere to the [Between the Flags CERS policy](#).** If unable to contact appropriate medical officer immediately OR they are unable to attend immediately, dial 2222 and initiate a Rapid Response call.
- See [APLS Algorithm](#) for management

The Paediatric Improvement Collaborative Clinical Practice Guideline (https://www.rch.org.au/clinicalguide/guideline_index/Afebrile_seizures/) has been endorsed by the NSW Agency for Clinical Innovation however information in this guideline is specific for SCHN

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st July 2021	Review Period: 3 years
Team Leader:	Clinical Nurse Consultants	Area/Dept: Neurology, CHW & SCH

CHANGE SUMMARY

- Due for mandatory review.
- Added APLS Status Epilepticus Algorithm.
- Levetiracetam dose and administration updated on algorithm.
- Added link to SCHN phenytoin drug protocol.
- Removed duplication of information related to anti-epileptic medication; paraldehyde information (manufacture discontinued) and example of Midazolam factsheet, Appendix 2 (updated link added).
- Term change: anti-epileptic drug (AED) to anti-seizure medication (ASM).
- Change of title from “Seizures – Acute Management in Infants and Children”

READ ACKNOWLEDGEMENT

- Medical and Nursing staff caring for patients requiring seizure management should read and acknowledge they understand the contents of this document.

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Management of Status Epilepticus ⁸

*** Reversible Causes**
Systemic:
 Hypoglycaemia
 Hyponatremia
 Hypertensive Emergency
Intracranial:
 Infection
 Bleed
 Raised ICP

Establish airway & apply oxygen
 Seek senior advice and assistance if necessary.
 In ward setting escalate to BTF Rapid Response after 5 minutes of seizure
 Identify and include previous doses of Midazolam or Diazepam given within 1 hour prior to presentation

Consider reversible causes *
 DON'T FORGET GLUCOSE: If BGL <3.0 mmol/L give 2 mL/kg 10% glucose IV (as bolus)
 Then commence IV maintenance fluids with 5–10% glucose and REPEAT BGL within 5 mins

Vascular Access?

YES

NO

5 min
 From onset of seizure

Midazolam 0.15 mg/kg IV (max 10 mg)
OR
Diazepam 0.25 mg/kg IV (max 10 mg)

Midazolam 0.3 mg/kg Buccal or Intranasal (max 10 mg)
OR
Midazolam 0.15 mg/kg IM (max 10 mg)
 Continue attempts to achieve IV/IO access

Vascular Access?

5 min
 After 1st dose Midazolam

If previous doses *not* administered at home/in ambulance:
 Repeat either:
Midazolam 0.15 mg/kg IV (max 10 mg) OR
Diazepam 0.25 mg/kg IV (max 10 mg)

If still fitting obtain vascular access, if necessary by *intraosseous route*

5 min
 After 2nd dose Midazolam

Confirm that it is an epileptic seizure
Give Levetiracetam or Phenytoin **
Escalation as per local rapid response team

5 min
 After infusion finished

Give Levetiracetam or Phenytoin (whichever was not given above)
OR
Phenobarbitone

****Notes on second line agents:**
Phenytoin 20 mg/kg IV or Intraosseous (max 1.5 g) (over 20 mins for doses <1 g*) OR
Levetiracetam 40 mg/kg IV or Intraosseous (max 3 g) (over 15 mins for child age <3 months and over 5 minutes for ≥3 months)
 Children already on maintenance Levetiracetam may also be loaded with 40 mg/kg/dose **OR**
Phenobarbitone 20 mg/kg IV or Intraosseous (max 1 g) (over 20 mins)
 If already on phenytoin or phenobarbitone halve the above loading dose of that anti-seizure medication.

5 min
 After infusion finished

Maintain continuous monitoring of ECG, respiratory rate, and oximetry whilst child is still fitting or unconscious. **NOTE:** A child whose conscious state is not improving as expected after apparent termination of the seizure may be in subclinical status and

Activate Code Blue response, secure the airway (intubate and ventilate) and terminate seizure with intravenous anaesthesia agents.

Additional Considerations
In ward areas - a rapid response should be called for any child with a seizure persisting at 5 minutes if it hasn't already been called
Buccal / intranasal midazolam can be administered by a RN
In ward area – Midazolam can be located in the resuscitation trolley
IV midazolam needs to be administered by a Medical officer
IV levetiracetam (keppra), phenytoin , fosphenytoin OR phenobarbitone can be administered by RN following relevant policy and medication guidelines
Phenytoin – Infuse at 1–2 mg/kg/minute or over 20 minutes whichever is slower (maximum rate of 50 mg/minute). Refer to SCHN Phenytoin administration protocol
Fosphenytoin should be used for Neurology patients with single lumen central line or port-a-cath. Please contact on-call neurology fellow

1 General Principles – Acute Management of Seizures

- Processes for managing children with acute seizures are managed will vary depending on location (Emergency Department, Intensive Care, or Wards).
- The management of acute and chronic seizures in children with known epilepsy syndromes will be tailored to their specific needs and specific seizure plans in these children will over-ride generic information about the management of acute seizures and status epilepticus.
- Effective care and management of children experiencing seizures requires vigilant observation, strict observance of safety measures, accurate and timely administration of medication and comprehensive documentation.
- It is well recognised that most seizures are short and self-limiting and for this reason children/people diagnosed with epilepsy/seizures are not routinely discharged home from hospital with a supply of oxygen.
- However, in the acute setting and as per NSW health guidelines, children who experience generalised tonic clonic (GTC) seizures, should receive high flow oxygen via a face mask with a reservoir as soon as the airway has been demonstrated to be adequate^{1,7}. The principles of Paediatric Basic Life Support should be followed.
- **Patient safety** is a priority:
 - In children with known epilepsy, bed/cot rails must be up when the child is in bed. Perform and document a risk assessment and follow the [CEC Paediatric Cot and Bed Allocation Guide](#).
 - The child must be supervised in the bath or shower¹⁰.
 - The child must be accompanied by an adult whilst out of the ward.
- Accurate documentation of seizure activity is important¹⁰. For children with known epilepsy this should be recorded on the [Seizure Record Chart \(M36G\)](#) [[Appendix 1](#) provides an example of the chart].

2 Care of a Patient during a Seizure

- If this is the child's first seizure and the child is on the ward, the medical officer **must** be notified immediately via Rapid Response.
- Remain calm, time the seizure and stay with child¹⁰.
- In order to protect their airway, maintain the position of the child on their side or apply appropriate airway opening manoeuvres as per paediatric basic life support.
- Apply high flow oxygen via a face mask with a reservoir as soon as the airway has been demonstrated to be adequate^{1,7}.
- Gently suction the oral cavity under direct vision only if required.
- Check heart rate and vital signs.

- In the setting of a child with stable chronic seizures and a known diagnosis of epilepsy who has a specific seizure plan, neurological observations (GCS) may not be necessary. This needs to be articulated in the child's seizure plan
- In all other situations children with acute seizures should have neurological assessment and observations (GCS) recorded as per Between the Flags processes.
- If the child vomits, position them onto their side immediately and suction as required.
- Closely observe the child's seizure activity to allow for accurate description and documentation on the [Seizure Record Chart \(M36G\)](#). (Intranet Link)
- Measure blood sugar level (BSL)^{1,7,10}.
- Protect the child from injury but do not forcibly restrain them. Remove obstacles from the child's environment, and only move the child if it is safe to do so. Loosen any restrictive clothing (especially around neck area).
- If the child is not on the bed, place a small pillow, folded blanket or your hands under the child's head to prevent injury.
- Do not put anything in the child's mouth unless treatment includes administration of buccal midazolam¹⁰.

2.1 Following the Seizure

Following the seizure it is important to allow the child to sleep/rest in order to recover.

- Accurately document the seizure, stating date, time, description and duration and whether medication, oxygen and suction were administered (See the [Seizure Record Chart M36G](#)). The reverse side of the M36G provides a guideline for this documentation.

3 Status Epilepticus

- Seizures that persist beyond five minutes, have a higher risk of evolving into status epilepticus. Acute seizure management is therefore implemented at 5 minutes. **This is the operational definition of status epilepticus.**
- If the seizure is prolonged, i.e. longer than 5 minutes, the child is likely to need emergency administration of anti-seizure medicines (ASM's). Follow the child's individual seizure plan which should be clearly documented in the medical notes. If there is no plan documented, or no PRN medication, call a rapid response.
- Notify the appropriate medical officer if the seizure is prolonged (>5 minutes in duration), recurs, or if the child has a cluster of short seizures (over 5–10 mins) without fully recovering between events.
- Consider non-convulsive status epilepticus (NCSE) in any child who is taking longer than expected to recover from a convulsive seizure, or in a child with pre-existing epilepsy presenting with a prolonged period of altered awareness, without obvious motor seizures.

Note: The formal definition of Convulsive Status Epilepticus (CSE) is of a tonic-clonic seizure lasting for 30 minutes or longer, or recurrent seizures without regaining consciousness in

between and lasting greater than 30 minutes. The operational (i.e. practical) definition of status epilepticus is 5 minutes.

4 Emergency Anti-Seizure Medication Administration

4.1 Administration of Buccal and Intranasal Midazolam

Buccal/intranasal midazolam can be administered in the emergency management of prolonged seizures^{2,6,8,11,12}, where intravenous access cannot be obtained. Buccal/intranasal midazolam may also be used in combination with other ASMs. **It is important to note that the IV preparation (plastic ampoule) is used.**

- Refer to Epilepsy Australia Action: [Administering Midazolam Fact Sheet for parents](#)

Buccal Midazolam

Equipment:

- IVI (not oral) luer-lock syringe. Appropriate size depending on age of patient and dose to be given.

Procedure:

1. Explain procedure to child/parent as appropriate.
2. Ensure privacy.
3. Check medication as per local practice
4. Draw up required amount of midazolam using a syringe.
5. Position child onto their side (recovery position).
6. Wipe away any secretions from mouth area and suction oral cavity **prior to** administration if required. Administer medication directly onto the buccal mucosa (inside cheek area). For example, if the child is lying on their left side administer into left cheek.

Intranasal Midazolam^{7,12}

Midazolam may also be given via intranasal route when the buccal route is not considered optimal e.g. if the child has copious oral secretions or they vomit during the seizure.

Procedure:

1. Explain procedure to child/parent as appropriate.
2. Ensure privacy.
3. Check medication as per medication handling practice guideline.
4. Draw up required amount of midazolam using syringe.
5. If safe to do so, position child onto their back with head tilted or briefly turn head to 'nose up position'.

6. Wipe child's nose of any secretions and administer midazolam gently, 2-3 drops at a time.
7. A mucosal atomiser device may be used as shown in this image.



Following Midazolam Administration - Buccal or Intranasal

- Following administration ensure child is comfortable, place them in the recovery position and observe vital signs.
- Observe the effectiveness of the medication. Midazolam should take effect within 3–7 minutes.
- If the **seizure continues or recurs call a Rapid Response**.
- Consider placement of an intravenous line.
- Allow child to rest/sleep following procedure.
- Midazolam has a sedative action, commonly causing drowsiness. Additionally, respiratory depression is a possible side effect, most likely associated with larger and/or cumulative doses. Close clinical observation and SaO₂ monitoring is necessary.
- Document description of the seizure and management on the [Seizure Record Chart \(M36G\)](#).

4.2 Administration of IV Midazolam

- A stat bolus dose(s) of intravenous Midazolam may be required in the emergency management of a seizure and this must be administered by a medical officer.
- Additionally, emergency seizure management may be escalated with the commencement of an IV midazolam infusion.
- **At CHW**, for information please see [Midazolam Infusion for the Acute Management of Seizures in Commercial Traveller's Ward - CHW](#).

4.3 Administration of Intravenous (IV) Phenytoin

- IV phenytoin may be administered in the acute management of seizures and there are special precautions around the use of this drug.
- Refer to: [SCHN Phenytoin Administration Drug Protocol](#)

4.4 General information – Anti-seizure medications (ASM)

- It is important that the child takes their prescribed oral ASM. If the child is fasting, their regular ASMs must be administered as per usual, with a minimal amount of water.
- Parents/ caregivers may need reassurance and education around the management of seizures and the antiepileptic medications

- If the child is vomiting or has diarrhoea, ASM serum levels may become sub-therapeutic, potentially increasing the likelihood of seizures. It is necessary to notify the appropriate medical officer if this occurs.
- If for any reason the child is unable to take their prescribed AED, notify the appropriate medical officer.

5 Anti-seizure medication doses and administration information

- [Meds4Kids Dosing Guide \(M4K\)](#)
- [The Paediatric Injectable Medicines Handbook \(PIMH\)](#)
- [AMH-Children's Dosing Companion \(AMH-CDC\)](#)
- [Midazolam Infusion for Management of Seizures and Acute Dyskinesias in Ward Areas – CHW Practice Guideline](#)
- [SCHN Pyridoxine \(Vitamin B6\) and Pyridoxal - 5- phosphate for Treatment of Seizures](#)
- [SCHN Phenytoin Administration Drug Protocol](#)

6 Discharge Instructions/ Education

Most seizures are short in duration and self-limiting. For this reason, children diagnosed with epilepsy are not routinely discharged home from hospital with a supply of oxygen or any other seizure monitoring equipment.

- Provide education for the family on first aid management and care of the child during a seizure, including the administration of emergency medications at home. Advise the family about when medical attention should be sought. A written individualised seizure management plan may be helpful¹⁰.
- Ensure supply of midazolam is facilitated for the family via an internal prescription for the hospital pharmacy prior to discharge if indicated.
- Educate the family/caregiver and the child about the importance of medication compliance.
- Provide reassurance/support to family/caregiver. Encourage the family to notify the school/childcare centre that the child has had a seizure.
- Encourage the family/caregiver to promote normal activities with usual safety measures e.g. helmet when riding bike etc. Educate family/caregiver in regards to water safety. It is imperative the child is never left alone in, or around water. Encourage older children to use the shower rather than the bath.
- If the child has a diagnosis of epilepsy and extra support is needed, it may be helpful to inform the family/caregiver about:
 - The community support organisation [Epilepsy Action Australia](#) may be able to offer the family/caregiver further support/education.

- [Paediatric Epilepsy Network NSW \(PENNSW\)](#)
- [SCHN Seizures and Epilepsy fact sheet](#)
- If family/caregivers need additional support/guidance, or if the child's seizures are difficult to control, contact relevant CNC Complex Epilepsy or CNC Neuroscience/Epilepsy, available at CHW and SCH.
- Ensure the family/caregiver either have follow-up appointment/s, or understand how to make them.
- If the child has had a febrile seizure, the family/caregiver may need further advice regarding fever management. Offer the family/caregiver the relevant **SCHN fact sheets** on:
 - [Febrile convulsions](#)
 - [Fever management](#)

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Appendix 1: Example of the Seizure Record Chart (M36G)

NSW Health		The Sydney Children's Hospitals Network		Family Name:	MRN:
				Given Name:	<input type="checkbox"/> Male <input type="checkbox"/> Female
				D.O.B:	M.O:
				Address:	
Facility: Westmead				Location/Ward:	
SEIZURE RECORD CHART				COMPLETE ALL DETAILS OR AFFIX PATIENT LABEL HERE	
SEIZURE- Type 1 (description)	SEIZURE- Type 2 (description)	SEIZURE- Type 3 (description)	WITNESSED BY S= staff P=parent/carer	Intervention	
				Duration	
SEIZURE DESCRIPTION (as above) Or, if new type write a description					
Time					
Date					

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NSW Health		The Sydney Children's Hospitals Network		Family Name:	MRN:
				Given Name:	<input type="checkbox"/> Male <input type="checkbox"/> Female
				D.O.B:	M.O:
				Address:	
Facility: Westmead				Location/Ward:	
SEIZURE RECORD CHART				COMPLETE ALL DETAILS OR AFFIX PATIENT LABEL HERE	
Guidelines for completing the Seizure Chart					
Documentation			Document what you observe.		
BEFORE EVENT	What Happened before the seizure/event?		Was there any change/s in child's behaviour or mood- irritability, confusion? Did they experience any unusual sensation (feeling, taste, smell, vision, hearing)? Was there any provoking factors or trigger- e.g. fever, headache, vomiting?		
	What happened during the seizure/event?		Where or which part of the body was affected, how did the event begin? Were the eyes open or closed? Was the child conscious / responsive/ able to talk during the event? Ask them to remember a word or a colour. Was there deviation of the head or eyes? Eyes deviated to left sided and turning head to left. Was there 'stiffening' of one side more than other? Was there any posturing? e.g. left arm flexed. Was there 'twitching' or 'jerking' movements- one body part or more? Was there any eye deviation? Was there any facial twitching, or left sided jerking or eye deviation?		
AFTER EVENT	What happened after the seizure/event?		Was the seizure/event self-resolving? Was the child confused, irritable and/or drowsy after the event? Was there any weakness noted? e.g. left arm weak. What intervention was required? e.g. 'Midazolam administered'.		
Refer to Seizure Management Practice Guideline for more information- http://chw.schn.health.nsw.gov.au/o/documents/policies/guidelines/2006-8037.pdf					

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