

Seizures in Children

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Note:

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Explanation of the aboriginal artwork:

The aboriginal artwork used symbolises the connection to country and the circle shape shows the strong relationships amongst families and the aboriginal culture. The horse shoe shape design shown in front of the generic statement symbolises a woman and those enclosing a smaller horse shoe shape depicts a pregnant woman. The smaller horse shoe shape in this instance represents the unborn child. The artwork shown before the specific statements within the document symbolises a footprint and demonstrates the need to move forward together in unison.



Cultural safety enhances clinical safety.

To secure the best health outcomes, clinicians must provide a culturally safe health care experience for Aboriginal children, young people and their families. Aboriginal children are born into strong kinship structures where roles and responsibilities are integral and woven into the social fabric of Aboriginal societies.

Australian Aboriginal culture is the oldest living culture in the world, yet Aboriginal people currently experience the poorest health outcomes when compared to non-Aboriginal Australians.

It remains a national disgrace that Australia has one of the highest youth suicide rates in the world. The over representation of Aboriginal children and young people in out of home care and juvenile detention and justice system is intolerable.

The cumulative effects of forced removal of Aboriginal children, poverty, exposure to violence, historical and transgenerational trauma, the ongoing effects of past and present systemic racism, culturally unsafe and discriminatory health services are all major contributors to the disparities in Aboriginal health outcomes.

Clinicians can secure positive long term health and wellbeing outcomes by making well informed clinical decisions based on cultural considerations.

The term 'Aboriginal' is used to refer to people who identify as Aboriginal, Torres Strait Islanders, or both Aboriginal and Torres Strait Islander. This is done because the people indigenous to South Australia are Aboriginal and we respect that many Aboriginal people prefer the term 'Aboriginal'. We also acknowledge and respect that many Aboriginal South Australians prefer to be known by their specific language group(s).

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Purpose and Scope of PCPG

The Seizures in Children Clinical Guideline is primarily aimed at medical staff working in regional, general or tertiary hospitals, and should be used to guide management. The information is current at the time of publication, and provides a minimum standard for the assessment and acute management of children with seizures in a hospital setting. It does not replace or remove clinical judgement or the professional care and duty necessary for each specific case.

Acute Hospital Management of Seizures

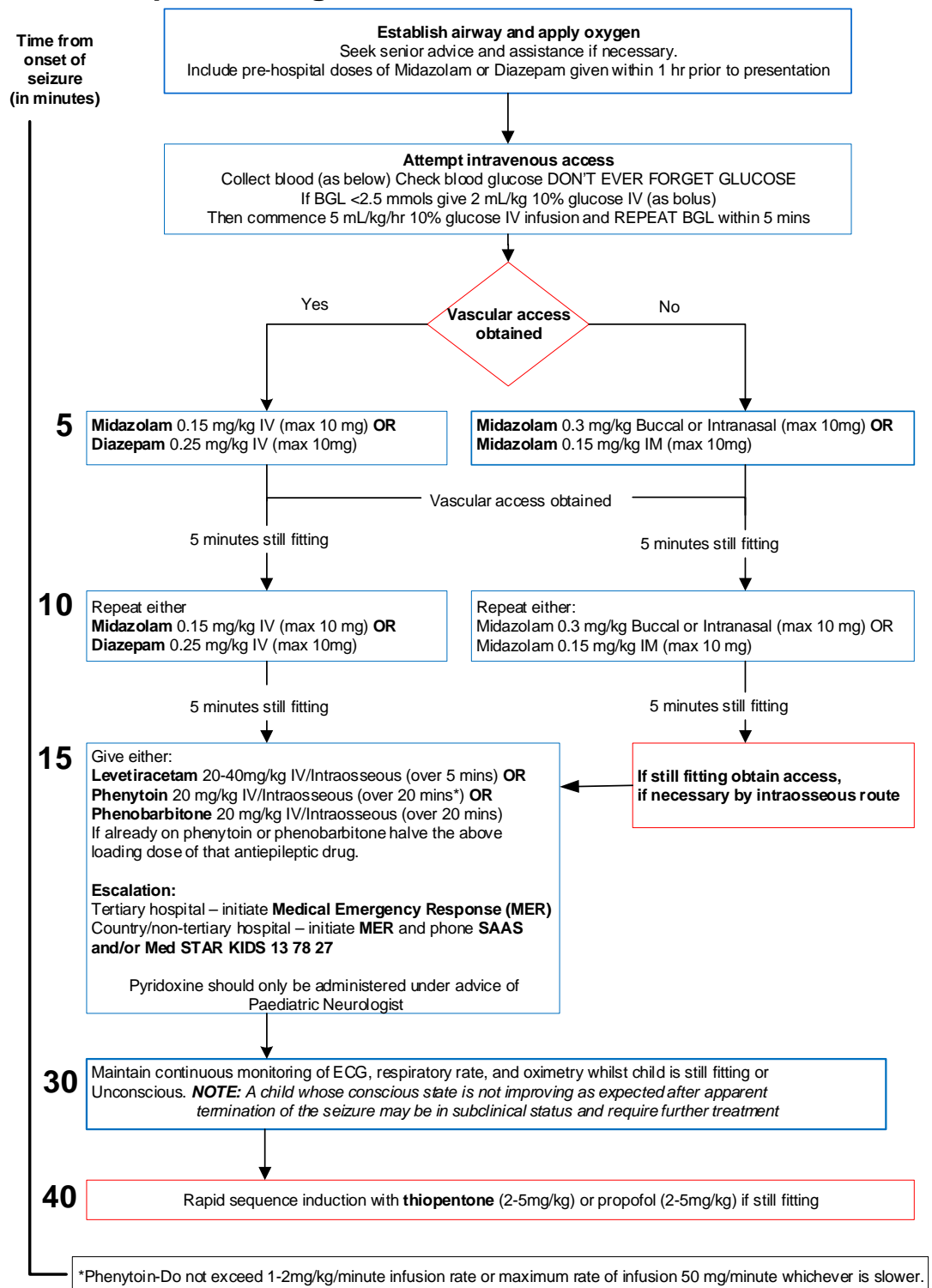


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Summary of Practice Recommendations

See [management flowchart](#).

Abbreviations

ABC	Airway, Breathing and Circulation
BSL	Blood Sugar Level
CNS	Central Nervous System
CSE	Convulsive Status Epilepticus
HDU	High Dependency Unit
IM	Intramuscular
IN	Intranasal
IV	Intravenous
OPA	Oropharyngeal Airway
NPA	Nasopharyngeal Airway
RSI	Rapid Sequence Induction
VP	Ventriculoperitoneal

Definitions

Seizure	<ul style="list-style-type: none">> A sudden attack of altered behaviour, consciousness, sensation or autonomic function produced by a transient disruption of brain function. The result of this altered brain function is most commonly a tonic (stiffening) or tonic-clonic (stiffening-jerking) seizure.> When the seizure has visible movements, it is also known as a convulsion. Non-convulsive seizures, i.e. those not associated with visible movements may also occur, but are rare and occur usually in the context of a child with a previous diagnosis of epilepsy.> Common in children, with about eight percent having at least one seizure by 15 years of age.
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Convulsive Status Epilepticus (CSE)

CSE is defined as a continuous generalised seizure lasting ≥ 5 minutes, or two or more discrete seizures between which there is incomplete recovery of consciousness.

Although the outcome of CSE is mainly determined by its cause, the duration of the seizure is also relevant and the optimum management is to terminate the seizure rapidly, effectively and safely.

CSE has mortality in children of approximately four per cent.

Neurological sequelae of CSE (epilepsy, motor deficits, learning difficulties, and behaviour problems) are age dependent, occurring in six per cent of those over the age of three years but in 29 per cent of those under one year.

Causes

Many underlying conditions and neurological challenges may provoke seizures, and in over 50 per cent of children seizures are isolated events associated with either a sudden onset of high fever (febrile seizures or febrile convulsions) or minor head injury in early childhood.

Most acute seizures in children are brief and self-limiting, not requiring any treatment. Seizures that persist beyond five minutes may not stop spontaneously and it is usual practice to implement acute seizure treatment when the seizure lasts more than five minutes.

Assessment

Assessment and management need to occur concurrently if the child is actively convulsing.

Key considerations in assessment include:

- > Any compromise to ABC
- > **DON'T EVER FORGET GLUCOSE**- Obtain BSL early and correct hypoglycaemia with 2ml/kg bolus of 10% dextrose
- > Consider collecting "hypo-kit" bloods (7mL ideally) in child without known cause
- > [Check the local paediatric hypoglycaemia guidelines for more information](#)
- > Duration of seizure including pre-hospital period
- > Significant past history including seizures, neurological comorbidity including VP shunts, renal failure (hypertensive encephalopathy), endocrinopathies (electrolyte disturbance)
- > Focal features
- > Fever (Febrile convulsion or CNS infection/septicaemia)
- > Anticonvulsant medications including any acute pre hospital treatment
- > Previously successful acute anticonvulsant management
- > Evidence of underlying cause that may require additional specific emergency management
 - Hypoglycaemia
 - Electrolyte disturbance including hypocalcaemia
 - Meningitis
 - Drug overdose
 - Trauma (consider occult head trauma)
 - Stroke and intracranial haemorrhage

Management

Initial support and resuscitation

- > **Airway:** ensure airway is patent, and if not, it should be opened and maintained with airway opening manoeuvres and/or OPA/NPA as well as gentle suction
- > **Breathing:**
 - All fitting children should receive high flow oxygen through a face mask with a reservoir as soon as the airway has been demonstrated to be adequate.
 - Prolonged seizures and/or repeated doses of anti-epileptic medications may lead to compromise of breathing requiring ongoing support including intubation. Help from senior clinicians should be obtained for any advanced airway intervention.
- > **Circulation:** obtain IV access early. If not readily obtained, the initial benzodiazepine should be given by IN/IM/buccal. Obtain BSL and treat hypoglycaemia. If shock present, give a bolus of 20mL/kg sodium chloride 0.9%.

Seizure Management

In most situations (see above) supportive care for 5 minutes is appropriate. Ensure adequate airway and breathing while waiting for convulsion to stop spontaneously.

If seizure persists or the onset has not been witnessed, pursue active management (see [management flowchart](#) and [drug dose table](#)).

Include benzodiazepines given on the way to hospital (e.g. by parents or paramedics) when using this algorithm.

- > Support airway and breathing, apply oxygen by mask, and monitor.
- > Secure IV access, check bedside BSL and send urgent specimen for calcium / electrolytes and venous blood gas. If hypoglycaemia present (BSL<2.5), give 2mL/kg 10% Dextrose IV as bolus and repeat as needed. Consider taking 1-2 mL extra blood for hypoglycaemic diagnostic tests prior to giving bolus. Then commence 5mL/kg per hour 10% dextrose IV infusion and repeat BSL within 5 minutes.
- > Give benzodiazepine (Generally either diazepam or midazolam).
- > Repeat benzodiazepine after 5 minutes of continuing seizures.
- > If convulsion continues for a further 5 - 10 minutes, commence IV phenytoin or levetiracetam. Consider phenobarbital for children <12 months of age. If IV access cannot be secured and seizures refractory to benzodiazepines, consider IO access.
- > Consider pyridoxine (100mg IV) in young infants with seizures refractory to standard anticonvulsants. This is given by slow injection, and is not recommended without prior discussion with paediatric neurologist.
- > Seek senior assistance if seizure not controlled. Anticipate need to support respiration, if not already required. Rapid sequence induction (RSI) with thiopentone or propofol may be required for seizure control.
- > Also see [seizure management flowchart](#).

Consider consultation with local paediatric team:

- > Infants
- > Prolonged seizures
- > Incomplete recovery
- > Focal seizures or post ictal findings
- > Previous seizures
- > Developmental delay
- > Existing comorbidities

When to consider transfer to tertiary centre:

- > Child requiring care beyond the comfort level of the hospital.
- > Child having required intubation and ventilation, or HDU type monitoring (rare case of benzo infusion)
- > Consult MedSTAR KIDS on 13STAR (i.e. 13 7827) for transfer



References

1. Appleton R, Choonara I, Martland T, Phillips B, Scott R, Whitehouse W. The treatment of convulsive status epilepticus in children. The Status Epilepticus Working Party, Members of the Status Epilepticus Working Party. Arch.Dis.Child 2000;83:415-9.
2. Department of Health NSW (2016). Infants and Children: Acute Management of Seizures. [GL2016_005]. Ministry of Health, NSW.
3. Hanna N J, Black M, Sander JWS, Smithson WH, Appleton R, Brown S, Fish DR (2002) The National Sentinel Clinical Audit of Epilepsy-Related Death: Epilepsy–death in the shadows. The Stationery Office.
4. National Institute for Health and Care Excellence (2011). The epilepsies: the diagnosis and management of the epilepsies in adults and children in primary and secondary care. [CG137]. London: National Institute for Health and Care Excellence.
5. Royal Children's Hospital, Melbourne, Australia, Clinical Practice Guideline on Febrile Seizures, [Internet, last updated 27 November 2012; cited 20 May 2013], Available from: <http://www.rch.org.au/clinicalguide/index.cfm>
6. Trinka et al. Definition and classification of status Epilpeticus -Report of the ILAE Task Force on Classification of SE. Epilepsia 2015; 56 (10):1515-23
7. Dalziel et al. Levetiracetam versus phenytoin for second-line treatment of convulsive status epilepticus in children (ConSEPT): an open-label, multicentre, randomised controlled trial. Lancet. 2019 Apr 17. pii: S0140-6736(19)30722-6. [Epub ahead of print]
8. Lyttle et al. Levetiracetam versus phenytoin for second-line treatment of paediatric convulsive status epilepticus (EcLiPSE): a multicentre, open-label, randomised trial. Lancet. 2019 Apr 17. pii: S0140-6736(19)30724-X. [Epub ahead of print]



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Write Group Lead

Dr Damian Clark

Other major contributors

Hannah Green
Keiko Morioka

SA Paediatric Clinical Practice Guideline Reference Group Members

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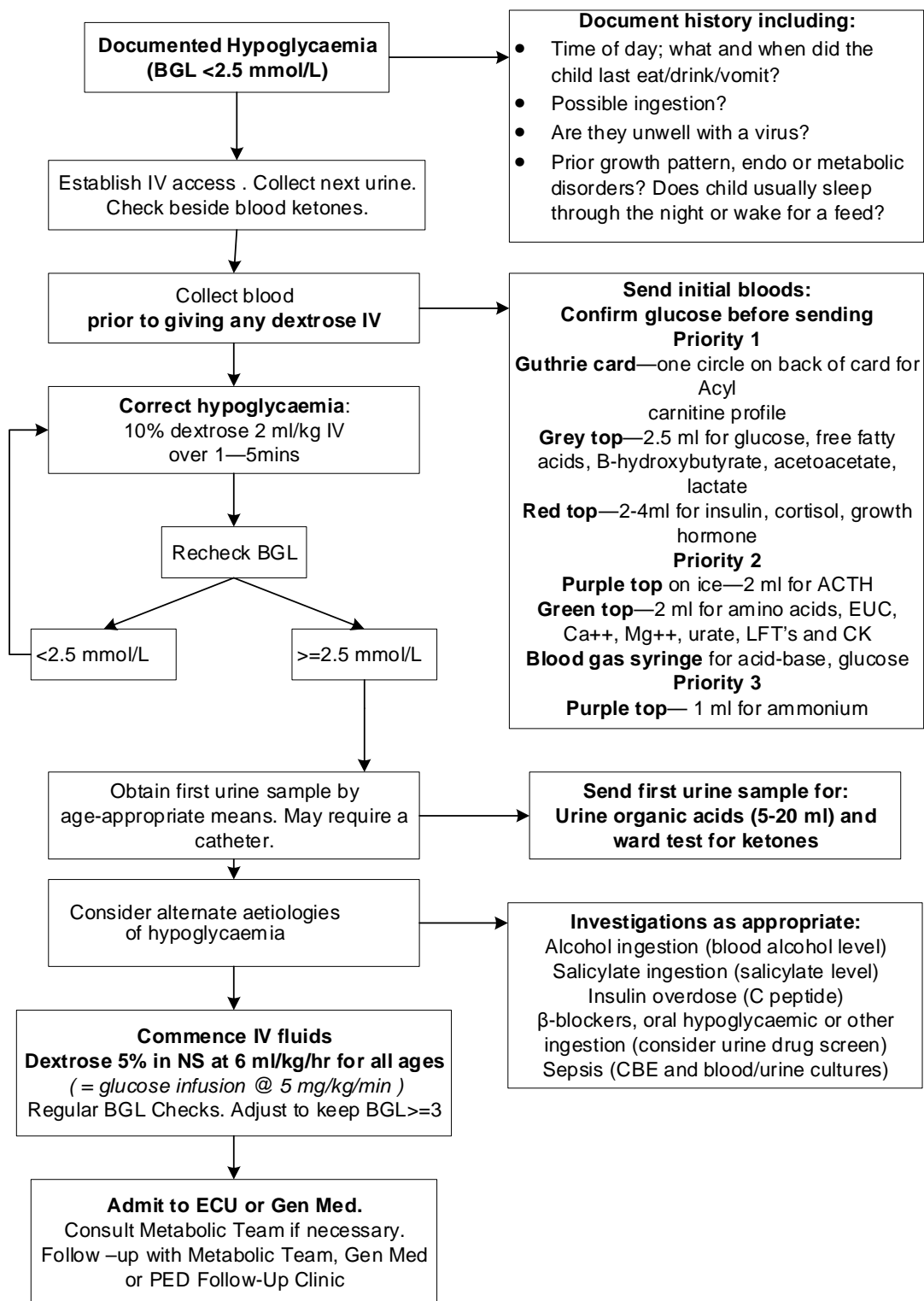


Appendices

Appendix 1 - Table of Medication

Drug	Route	Dose	Comments
Diazepam	IV/ IO PR	0.1-0.3 mg/kg 0.3-0.5 mg/kg (max 10mg)	IV route preferable but alternate routes can be used if rapid IV access not achieved. If 2 appropriate doses fail to terminate the seizure, further doses are unlikely to be effective and increase the risk of respiratory depression.
Levetiracetam	IV/IO	20-40mg/kg	Given over 5 minutes
Midazolam	IV/IO/IM Buccal Intranasal	0.15 mg/kg 0.3 mg/kg (max 10mg) 0.2-0.5 mg/kg (max 10mg)	IV route preferable but alternate routes can be used if rapid IV access not achieved. If 2 appropriate doses fail to terminate the seizure, further doses are unlikely to be effective and increase the risk of respiratory depression. Use plastic ampoules for buccal and intranasal dosing.
Phenobarbitone	IV/IO	20mg/kg	Given over 20 minutes in monitored patient.
Phenytoin	IV/IO	20mg/kg	Given over 20 minutes in monitored patient.
Propofol	IV/IO	2.5mg/kg stat followed by infusion at 1-3mg/kg/hr for no longer than 48 hours	Use only with involvement of senior staff confident with airway management. For refractory seizures requiring RSI and ventilation. Beware hypotension.
Pyridoxine	IV/IM	100mg	Only give after discussion with paediatric neurologist. Can induce apnoea in cases of pyridoxine dependent epilepsy.
Thiopentone	IV/IO	2-5 mg/kg slowly stat followed by IV infusion at 1-4 mg/kg/hr	Use only with involvement of senior staff confident with airway management. For refractory seizures requiring RSI and ventilation. Beware hypotension.

Appendix 2 - Management of hypoglycaemia in paediatric emergency department



Author: Dr Cheryl Kasel

Endorsed by: Departments of Metabolic Disease, Endo-crinology,
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