Queensland Paediatric Guideline

Emergency

Status epilepticus - Emergency management in children

Purpose

This document provides clinical guidance for all staff involved in the care and management of a child presenting to an Emergency Department (ED) in Queensland with status epilepticus.

This guideline has been developed by senior ED clinicians and Paediatricians across Queensland, with input from Neurology and PICU, Queensland Children's Hospital, Brisbane. It has been endorsed for statewide use by the Queensland Emergency Care of Children Working Group in partnership with the Queensland Emergency Department Strategic Advisory Panel and the Healthcare Improvement Unit, Clinical Excellence Queensland.

Key points

- Status epilepticus (defined as seizure lasting greater than five minutes or repeated seizures without full recovery to normal conscious level between episodes) is a neurological emergency.
- Refractory status epilepticus is associated with significant mortality and high neurological morbidity.
- The risk of a seizure becoming refractory increases with increasing seizure duration.
- Emergency management is aimed at stopping the seizure as soon as possible while maintaining vital functions.
- Benzodiazepines including Midazalom (preferred) and Diazepam are recommended first-line agents.
- Commence second-line agents if seizures continue after two doses of first-line agent.
- Commonly used second-line agents include Levetiracetam, Phenytoin (preferred for child greater than 1 year), and Phenobarbitone (preferred for child less than 1 year).
- Check blood glucose levels on all children presenting with a seizure. Manage as per Hypoglycaemia Guideline if less than or equal to 2.6 mmol/L.
- Rapid sequence induction and intubation is recommended for children who continue to have seizures despite the administration of second-line agents.

Introduction

Seizures are paroxysmal and involuntary events of altered consciousness, behaviour, motor skills, sensation or autonomic function that result from abnormal rhythmic discharges of cerebral neurons.[1] The majority of seizures are convulsive (involve a change in muscle tone or activity).

Individual convulsive seizures are often broadly classified as focal or generalised, based on their degree of body involvement. Classification may aid diagnosis and direct ongoing treatment in some cases, however the management priority in all seizure types is to protect the airway and terminate the seizure.

The causes of seizures are numerous, but the majority occur in the setting of a pre-existing seizure disorder, febrile illness, central nervous system (CNS) infection, head injury, poisoning or metabolic disturbance.

Epidemiological studies typically define status epilepticus as seizures lasting greater than 30 minutes or recurring without recovery to baseline consciousness over a 30 minute period.[2] Given the risks associated with increasing seizure duration, for the purposes of clinical management seizures lasting greater than five minutes are defined as status epileptics.

Status epilepticus (defined as seizure lasting greater than five minutes or repeated seizures without full recovery to normal conscious level between episodes) is a neurological emergency.

The risk of a seizure becoming refractory to drugs increases with increasing seizure duration.

Depending on seizure duration, age and aetiology, refractory status epilepticus is associated with a high neurological morbidity (10 - 20%) and a significant mortality (3 - 8%).

ALERT – Seizures must be terminated as soon as possible to avoid harm including death. Aim to have all seizures requiring second-line agents to be terminated within 30 minutes.

Epidemiology

Febrile convulsions are seen in 2 - 4% of children, whereas epilepsy (an idiopathic susceptibility to recurrent seizures) occurs in about 0.5% of children.[3]

The incidence of status epilepticus is estimated as 10-40/100,000.

Seizures account for 1 - 2% of all ED presentations to the specialist children's hospitals in Brisbane, of which 4 - 6% are Triage Category of 1 (assumed to be actively seizing on arrival). An Australian and New Zealand study[4] found that in children presenting with ongoing seizure activity for greater than 10 minutes, the median pre-hospital seizure duration was 45 minutes. Almost half of these had received anticonvulsant treatment by a parent, carer or ambulance officer. This suggests that children who present with ongoing seizures to the emergency service are likely to already be in established (and possibly refractory) status epilepticus and highlights the emergent need to rapidly terminate their prolonged seizures to minimise adverse events.

Assessment

Ask the family if the child has a Seizure Management Plan. If so they will often have a copy with them. Otherwise access via the medical record.

History

History taking should include information on:

- details preceding the seizure including:
  - prior events and behaviour of the child
  - signs or symptoms of illness including fever
- details of the seizure including:
  - how it started
  - estimated duration
  - pre-hospital treatment
- any previous seizures and family history of seizures
- if relevant, previous seizure management including ketogenic diet
- medical and surgical history including intracranial infection or severe metabolic disturbance such as hypoglycaemia or electrolyte disturbance, neurological damage, neurosurgical procedures (including the placement of ventriculo-peritoneal shunts)

Examination

Emergency assessment and management should always involve a rapid primary survey with evaluation of (and immediate management of concerns with) airway, breathing, circulation and disability (ABCD).

Seek urgent senior emergency/paediatric advice as per local practice for a child with status epilepticus who has received two doses of benzodiazepines pre-hospital.

Consider seeking senior emergency/paediatric advice as per local practice for child with status epilepticus who has received a single dose of benzodiazepine prior to arrival.

Differential diagnoses

Other neurological conditions can present with altered level of consciousness and abnormalities of tone, posture or movement and need to be differentiated from convulsive status epilepticus. A careful history and examination will usually distinguish between these conditions. Diagnosis of an epileptic seizure should not be based on the presence or absence of single features.

Differential diagnoses
Paroxysmal non-epileptic events (formerly termed "Pseudoseizures")
Extensor posturing due to raised intracranial pressure
Acute movement disorders (chorea, tic)
Dystonia
Acute encephalopathy from infectious or metabolic cause

Investigations

Check blood glucose levels on all children presenting with a seizure.

Other investigations are usually directed by history and examination findings.

Investigations for the management of status epilepticus in children	
Investigation type	**Utility**
Blood glucose level	Recommended for all children with seizure.
Electrolytes	Recommended for children with a history of vomiting or diarrhoea.
Calcium & magnesium	Considered in children with afebrile seizures, particularly infants.
Antiepileptic drug (AED) levels	Check AED levels for children receiving maintenance phenytoin, carbamazepine or phenobarbitone. Levels of other AEDs are not recommended unless adherence is thought to be an issue.
Electrocardiography (ECG)	Considered in children seen to fall prior to seizure, or family history of seizures or unexplained death.
Neuroimaging	Considered for children with trauma, focal onset of the seizure or focal neurological signs.
Electroencephalography (EEG)	Not routinely recommended in the acute phase if seizures are controlled. For suspected persisting seizure activity or delayed return of conscious state consult a paediatric neurologist.

Management

Refer to Appendix 1 for a summary of the emergency management and medications for children presenting with status epilepticus.

The goals in the emergency management of status epilepticus are to maintain vital functions whilst stopping the seizure as soon as possible and to identify and treat any underlying cause.[5]

Monitor the frequency, duration and type of seizures using the seizure chart.

First-line agents - benzodiazepines

Benzodiazepines work by binding to GABA (gamma-aminobutyric acid) receptors in the central nervous system, which in turn hyperpolarises the neuronal membrane making it more difficult for the neuron to be activated.[6] Midazolam and Diazepam are the benzodiazepines routinely used in the management of status epilepticus.

Midazolam

- rapid onset with anti-seizure effect often observed within one minute of IV administration[7]
- second dose is recommended if seizures are continuing five minutes after first dose
- more effective than Diazepam
- can be given reliably via the buccal, intranasal, IM, IV, or IO routes with IM the least reliable route for absorption
- oral absorption much less reliable
- buccal (or intranasal) Midazolam has largely replaced Diazepam PR for the management of seizures by parents and caregivers[3,8]
- short duration of action - children who stop convulsing after an initial Midazolam dose may require a repeat dose to maintain seizure control[6]

Midazolam dosing for the treatment of status epilepticus in children	
Buccal/intranasal	0.3 mg/kg (maximum 10 mg)
IV/ IO	0.15 mg/kg (maximum 10 mg)
IM	0.2 mg/kg (maximum 10 mg)
Side effects	Respiratory depression common, particularly with repeated dosing

Diazepam

- rapid onset of action with median anti-seizure effect seen within two minutes of IV administration[3,9]
- second dose is recommended if seizures are continuing five minutes after first dose
- can be given via the PR, IV or IO routes
- oral absorption is effective however usually not appropriate in a child with ongoing seizure activity
- long elimination half-life but only a relatively short-lasting anti-seizure effect of between 15-30 minutes

ALERT – Diazepam should **not** be given via IM injection due to slow and erratic absorption**.**

Diazepam dosing for the treatment of status epilepticus in children	
IV/ IO	0.1-0.4 mg/kg (maximum 10 mg)
PR	0.3-0.5 mg/kg (maximum 20 mg)
Side effects	Respiratory depression common

Second-line agents

Second-line agents are recommended if seizure continues despite appropriate doses of first-line agents. These drugs have a longer duration of action compared with first-line agents.

Second-line agents should be started as soon as possible following failure of benzodiazepines. Given that QAS routinely will have given benzodiazepine pre-hospital, consider preparing for administration of second-line agents as soon as QAS notification received of an impending arrival of a child with status epilepticus.

Seek urgent senior emergency/paediatric advice as per local practice for a child with ongoing seizures despite the administration of two doses of a first-line agent.

Latest research

Many questions remain about the optimal management of status epilepticus.[5] The Paediatric Research in Emergency Departments International Collaborative (PREDICT), including many sites within Queensland, published a superiority RCT in the Lancet that showed that "Levetiracetam is not superior to Phenytoin for second-line management of paediatric convulsive status epilepticus.[10] A similar study in the United Kingdom in the same journal also failed to demonstrate that Levetiracetam was superior to Phenytoin.[11] However, it concluded that the "previously reported safety profile and comparative ease of use of Levetiracetam, suggests it [Levetiracetam] could be an appropriate alternative to Phenytoin as first-choice, second-line anticonvulsant in the treatment of paediatric convulsive status epilepticus."

Levetiracetam IV (Keppra)

Levetiracetam IV is a new agent which appears to be effective in terminating seizures which are not responsive to benzodiazepines and Phenytoin. A number of studies have shown its safety and efficacy in terminating refractory status epilepticus thereby avoiding intubation and ventilation.[12] It can be infused over five minutes and appears to have no acute side effects relating to hypotension or respiratory depression and no known drug interactions.

Levetiracetam dosing for the treatment of status epilepticus in children	
IV loading dose	40 mg/kg (maximum 2.5 g) infused over five minutes.[9]

Phenytoin

Phenytoin is a suitable second-line agent in children aged greater than one year.

Phenytoin dosing for the treatment of status epilepticus in children	
IV	20 mg/kg (maximum 1,500 mg) administered over a minimum of twenty minutes. Administer more slowly (over sixty minutes) if seizure activity has ceased. Do not exceed rate of 1 mg/kg/min or 50 mg/min. Do not administer with IV solutions containing glucose.
Side effects	Arrhythmias Respiratory depression (less common than with Phenobarbitone)
Monitoring	Cardiac monitoring recommended during infusion period.

ALERT – Phenytoin is contraindicated in Dravet Syndrome, use Levetiracetam**.**

Phenobarbitone

A suitable second-line agent in:

- infants (up to one year)
- children with contraindication to Phenytoin
- children already on maintenance Phenytoin therapy

Phenobarbitone dosing for the treatment of status epilepticus in children	
IV	20 mg/kg (maximum 1 g) administered over a minimum of twenty minutes. Do not exceed rate of 1 mg/kg/min to avoid respiratory and/or circulatory impairment.
Side effects	Respiratory depression (if given in combination with benzodiazepines)[13]

Paraldehyde

- recommended for children without IV access
- recently discovered to breakdown to a very toxic metabolite crotonaldehyde, particularly in out-of-date stock
- use should balance risk of refractory convulsive status epilepticus against very small lifetime increased risk of cancer

Paraldehyde dosing for the treatment of status epilepticus in children	
PR	0.4 mL/kg 100% (0.8 mL/kg when mixed 1:1 in olive oil OR Sodium Chloride 0.9%)
IM	0.2 mL/kg (maximum 10 mL) as a single dose then 0.1 mL/kg/dose every four to six hours Give no more than 5 mL at any one site

ALERT – Maximum life-time dose of Paraldehyde should not exceed 30 mL

Seek urgent paediatric critical care/neurology advice (onsite or via RSQ) for a child who is continuing to have seizures following administration of second-line agent.

Newer agents

A number of anticonvulsants used as either first or second-line agents in the treatment of convulsive status epilepticus in other parts of the world may be given on advice from a paediatric neurologist.

Lorazepam (Ativan)

Lorazepam is the benzodiazepine of choice as a first-line agent across North America, UK and Europe. Lorazepam has rapid infiltration (one to two minutes after IV injection) across the blood-brain barrier and a relatively long half-life with an effective duration of action of four to six hours. It also has fewer side effects than other benzodiazepines, in particular respiratory depression.[14] One small quasi-randomised trial (the only trial in a Cochrane review) found Lorazepam IV superior to rectal Diazepam.[15] A recent large well conducted paediatric emergency based RCT comparing Lorazepam IV to Diazepam IV found no benefit from Lorazepam either in effectiveness in termination of seizures or reduction in side effects.[16]

Lorazepam (IV) dosing for the treatment of status epilepticus in children	
IV	0.05 - 0.1 mg/kg (maximum 4 mg/dose) administered over 2 - 5 minutes (maximum rate 2 mg/minute). Repeat dose may be given 10 - 15 minutes later if needed.

Lorazepam can be administered via several routes including buccal, rectal and intranasal. It is available in Australia through a Special Access Scheme for rapid tranquilisation for patients with acute agitation and disturbed behaviour.

Valproate IV (Epilim)

Seek senior paediatric neurology advice before prescribing Valproate IV.

Valproate IV is currently being used in a number of centres across the world as either a second line agent or a third line agent. Multiple small case series have been published, however no prospective randomized control trial for children in convulsive status epilepticus currently exists. A number of adult studies have shown that 60 - 80% of seizures not responding to benzodiazepines and Phenytoin will cease with administration of Valproate IV.[17,18] It does not appear to have significant adverse effects acutely with stable haemodynamic parameters following administration. Valproate IV is less frequently used in children due to the risk of hepatotoxicity in infants and young children or those with underlying metabolic condition.

Valproate (Epilim) dosing for the treatment of status epilepticus in children	
IV loading dose	30 mg/kg (maximum 800 mg) by slow IV injection over three to five minutes

ALERT –Valproate is contraindicated in children with suspected metabolic disease. Caution is required in children aged less than 2 years.

Specific (rare) treatable causes of status epilepticus

Treatment for the following may be given on advice from a paediatric neurologist:

- pyridoxine responsive seizures (treat with Pyridoxine 30 mg/kg by IV or IM injection)
- thiamine deficiency (treat with Thiamine IV 100mg – NOT dose/kg)
- hyperammonaemia (test requires EDTA tube on ice to lab and verbal request)
- hyponatraemia (see Hyponatraemia guideline) (QH only)
- hypomagnesaemia (see Magnesium Sulfate IV Medication Guideline (QH only))
- lignocaine toxicity (lipid rescue) (see Local Anaesthetic Systemic Toxicity guideline (QH only))

Rapid sequence induction and intubation

- a sequence of events designed to safely and quickly protect the airway and breathing of severely ill children to maintain oxygenation to the brain and vital organs.
- allows the use of larger doses of anti-epileptic medications whose primary adverse effects are hypoventilation and apnoea (e.g. benzodiazepines and barbiturates).
- facilitates the investigation (e.g. CT), treatment and management of causes of status epilepticus.

The steps of RSI (the 6 "P"s)

- preparation (equipment and staff) including team leader verbal plan
- pre-oxygenation (bag mask and F_iO_2 100%)
- pre-medication
- paralysis and sedation (Induction)
- passing airway tube and placement (including failed intubation plan)
- post-intubation management

Paralysis and Sedation (Induction)

Seek urgent paediatric critical care advice (onsite or via RSQ) for a child with status epilepticus requiring intubation.

Paralysis will lead to apnoea and is painful in awake individuals and therefore should follow induction with a sedation and analgesic agent.

Specific considerations around RSI/choice of agents in child with status epilepticus

Thiopentone or Propofol are suitable induction agents in status epilepticus as both medications are effective anticonvulsants when given as a bolus dose for induction. Caution is required in hypotensive patients; however, blood pressure is often high, and Thiopentone or Propofol usually well tolerated in the setting of status epilepticus. Cochrane reviews have not found any evidence that outcomes with Propofol are better or worse than Thiopentone.[19] Recent research suggests that Ketamine may have antiepileptic effects and may be an appropriate induction agent in haemodynamically unstable patients.

For status epilepticus, Rocuronium appears to be the drug of choice when available. Historically Succinylcholine (Suxamethonium) has been the most commonly used neuromuscular blocking agent due to its rapid onset (15 - 30 seconds) and short duration of action (5 - 10 minutes). Suxamethonium has an increased risk of causing life-threatening malignant hyperthermia (MHT), particularly in children with neuromuscular diseases, some of whom will present with seizures. Rocuronium is another agent that also has rapid onset (30 - 60 seconds) and is not associated with MHT but has a longer duration of action (30 - 60 minutes). Sugammadex is an antidote allows the safe reversal of paralysis due to Rocuronium if required.

Children requiring special consideration

Ketogenic diet

Some children with seizures are managed successfully on a ketogenic diet which often takes many weeks to stabilise. Glucose administration may negate the ketogenic diet and administration should be avoided unless they are hypoglycaemic. Consult with the Ketogenic Diet treating team or your local Paediatrician.

Vagal nerve simulators

Seek specialist advice in child with vagal nerve simulators as may affect management (may need to be switched off during anaesthesia, may trigger bradycardia if damaged by external defibrillation and contraindication for MRI).

Escalation and advice outside of ED

Clinicians can contact the services below if escalation of care outside of senior clinicians within the ED is needed, as per local practices. Transfer is recommended if the child requires a higher level of care.

> Status epilepticus (defined as seizure lasting greater than five minutes) is a neurological emergency. The risk of a seizure becoming refractory increases with increasing seizure duration.

Child is critically unwell or rapidly deteriorating child

Includes the following children
• ongoing seizure/s following second line agent • status epilepticus requiring close airway management and/or intubation

Reason for contact	Who to contact
For immediate onsite assistance including airway management	The most senior resources available onsite at the time as per local practices. Options may include: • paediatric critical care • critical care • anaesthetics • paediatrics • Senior Medical Officer (or similar)
Paediatric critical care and paediatric neurology advice and assistance	Onsite or via Retrieval Services Queensland (RSQ). If no onsite paediatric critical care service contact RSQ on **1300 799 127**: • for access to paediatric critical care and paediatric neurology telephone advice • to coordinate the retrieval of a critically unwell child RSQ (access via QH intranet) **Notify early of child potentially requiring transfer.** **Consider early involvement of local paediatric/critical care service.** In the event of retrieval, inform your local paediatric service.

Non-critical child

Consider seeking specialist advice regarding:
• management of children with ongoing seizures despite two doses of benzodiazepines • disposition of any child following resolution of status epilepticus

Reason for contact	Who to contact
Advice (including management, disposition or follow-up)	Options: • the local treating service for a child with previous history of seizures else the onsite/local paediatric service • Queensland Children's Hospital experts via Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) (24-hour service) • local and regional paediatric videoconference support via Telehealth Emergency Management Support Unit TEMSU (access via QH intranet) on 1800 11 44 14 (24-hour service)
Referral	First point of call is the onsite/local paediatric service

Inter-hospital transfers

Do I need a critical transfer?	• discuss with onsite/local paediatric service • view Queensland Paediatric Transport Triage Tool
Request a non-critical inter-hospital transfer	• contact onsite/local paediatric service • contact RSQ on 1300 799 127 for aeromedical transfers • contact Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) for transfers to Queensland Children's Hospital

Non-critical transfer forms	• QH Inter-hospital transfer request form (access via QH intranet)
	• aeromedical stepdown (access via QH intranet)
	• commercial aeromedical transfers:
	  ○ Qantas
	  ○ Virgin
	  ○ Jetstar

When to consider discharge from ED

Seek senior emergency/paediatric advice as per local practice prior to discharge for a child who has experienced status epilepticus.

Children for whom this is the first episode of status epilepticus are usually admitted for a period of observation. Discharge may rarely be considered for children who did not require administration of second-line agents for seizure control providing that:

- diagnosis of seizure is certain
- no further seizures after a period of observation for several hours
- child is alert and responding normally
- all observations (including GCS, pupil reaction, BP, Pulse Rate) are within normal ranges
- carers have been educated on the management of a subsequent seizure
- parents/caregivers are able to safely manage the child at home, return promptly in the event of deterioration/another seizure

Rarely, children may be discharged on Midazolam. This must only be done in consultation with Paediatric or Paediatric Neurology staff. If so, caregivers must receive education on its administration prior to discharge. This should be documented in medical record.

On discharge, caregivers should be provided with:

- Discharge letter for family and GP +/- specialist referral
- Seizures - First Aid Factsheet

Follow-up

Depends on seizure type (first or subsequent seizure, febrile or afebrile seizure, focal or generalised seizure) and whether episode represents a change in seizure control.

Discuss outpatient follow-up plan with local paediatric service. Refer to paediatrician/neurologist if urgent otherwise ask GP to arrange specialist referral.

When to consider admission

The majority of children with status epilepticus will require admission to an inpatient service. Admission to a SSU (where relevant) may be considered for a child in whom seizures have ceased following administration of first-line agents but require a further period of observation prior to discharge.

Related documents

Guidelines

- Refractory Status Epilepticus Management in Children (QH only)

Factsheet

- Seizures - First Aid Factsheet

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Guideline approval

Document ID	CHQ-GDL-60014	**Version no.**	2.0	**Approval date**	26/09/2019
Executive sponsor	Executive Director Medical Services			**Effective date**	26/09/2019
Author/custodian	Queensland Emergency Care Children Working Group			**Review date**	26/09/2022
Supersedes	1.0				
Applicable to	Queensland Health medical and nursing staff				
Document source	Internal (QHEPS) + External				
Authorisation	Executive Director Clinical Services (QCH)				

Keywords	Paediatric, emergency, guideline, seizure, convulsion, status epilepticus, 60014
Accreditation references	NSQHS Standards (1-8): 1, 4, 8

Disclaimer

This guideline is intended as a guide and provided for information purposes only. The information has been prepared using a multidisciplinary approach with reference to the best information and evidence available at the time of preparation. No assurance is given that the information is entirely complete, current, or accurate in every respect. We recommend hospitals follow their usual practice for endorsement locally including presenting it to their local Medicines Advisory Committee (or equivalent) prior to use.

The guideline is not a substitute for clinical judgement, knowledge and expertise, or medical advice. Variation from the guideline, taking into account individual circumstances may be appropriate.

This guideline does not address all elements of standard practice and accepts that individual clinicians are responsible for:

- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

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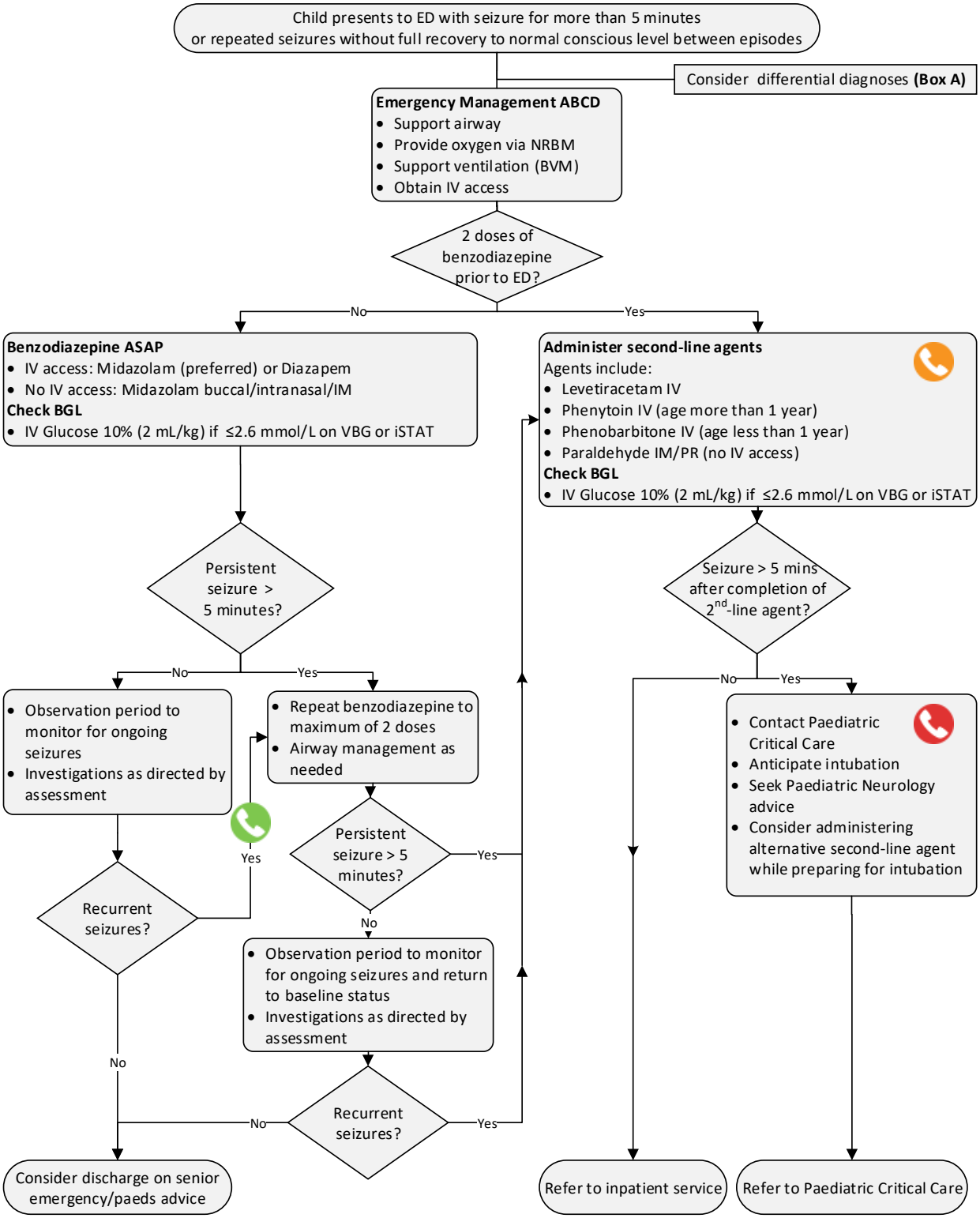

Box A: Differential diagnoses

- Paroxysmal non-epileptic events (formerly "Pseudoseizures")
- Extensor posturing due to raised intracranial pressure
- Acute movement disorders (such as chorea, tic)
- Dystonia
- Acute encephalopathy from infectious or metabolic cause

Consider seeking senior emergency/paediatric advice as per local practice

Seek senior emergency/paediatric advice as per local practice

Seek urgent paediatric critical care or paediatric neurology advice onsite or via Retrieval Services Queensland (RSQ) on 1300 799 127

CHQ-GDL-60014- Appendix 1 V2.0

First-line agents

Midazolam dosing for the treatment of status epilepticus in children	
Buccal/intranasal	0.3 mg/kg (maximum 10 mg)
IV/ IO	0.15 mg/kg (maximum 10 mg)
IM	0.2 mg/kg (maximum 10 mg)
Side effects	Respiratory depression common, particularly with repeated dosing

Diazepam dosing for the treatment of status epilepticus in children	
IV/ IO	0.1-0.4 mg/kg (maximum 10 mg)
PR	0.3-0.5 mg/kg (maximum 20 mg)
Side effects	Respiratory depression common

ALERT – Diazepam should **not** be given via IM injection due to slow and erratic absorption**.**

Second-line agents

Phenytoin dosing for the treatment of status epilepticus in children	
IV	20 mg/kg (maximum 1,500 mg) administered over a minimum of twenty minutes. Administer more slowly (over sixty minutes) if seizure activity has ceased. Do not exceed rate of 1 mg/kg/min or 50 mg/min. Do not administer with IV solutions containing glucose.
Side effects	Arrhythmias Respiratory depression (less common than with Phenobarbitone)
Monitoring	Cardiac monitoring recommended during infusion period.

Levetiracetam dosing for the treatment of status epilepticus in children	
IV loading dose	40 mg/kg (maximum 2.5g) infused over five minutes.

Phenobarbitone dosing for the treatment of status epilepticus in children	
IV	20 mg/kg (maximum 1 g) administered over a minimum of twenty minutes. Do not exceed rate of 1 mg/kg/min to avoid respiratory and/or circulatory impairment.
Side effects	Respiratory depression (if given in combination with benzodiazepines)

Paraldehyde dosing for the treatment of status epilepticus in children	
PR	0.4 mL/kg 100% (0.8 mL/kg when mixed 1:1 in olive oil OR Sodium Chloride 0.9%)
IM	0.2 mL/kg (maximum 10 mL) as a single dose then 0.1 mL/kg/dose every 4-6 hours Give no more than 5mL at any one site