GUIDELINE FOR THE MANAGEMENT OF FIRST UNPROVOKED SEIZURE IN CHILDREN

Ministry of Health
Male', Republic of Maldives

RELEASE RECORD

Version No	Version Date	Description of change
1	30 January 2024	Initial release

DOCUMENT NUMBER: MOH-QA/G/24/156-0

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Published by: Quality Assurance and Regulations Division
Ministry of Health, Male, Republic of Maldives

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1. BACKGROUND

First unprovoked seizures occur in 23 to 61 per 100,000 person-years. Unprovoked seizures are common in children with around 8% having a seizure by 15 years of age. The incidence is higher in children <1 year (130.2 per 100,000 person-years). Most seizures are brief and self-limiting, generally ceasing within 5 minutes. Most seizures do not cause serious harm.

A seizure may be epileptic or non-epileptic. An epileptic seizure may or may not be secondary to an acute neurological or other acute generalized illness (i.e. an acute symptomatic seizure). A first seizure or seizure cluster caused by an acute illness (acute symptomatic seizure) is unlikely to recur (3-10% recurrence). Some children after a first epileptic seizure will go on to have further epileptic seizures and be diagnosed with epilepsy. After a first unprovoked epileptic seizure 30-50% will recur; after a second unprovoked epileptic seizure 70-80% will recur. There are many different types of epilepsies and it is important to structure management of the individual around their particular seizure and epilepsy type and associated problems. All children with a first seizure require paediatric assessment, advice and follow up.

1.1 Scope of the guideline

This guideline is principally aimed at those children presenting acutely to paediatric services and it covers the definition, assessment, differential diagnosis, management, and treatment of first unprovoked seizures in children. Specifically, it aims to assist physicians in determining which patients need prompt diagnostic evaluation and which patients have higher risk of seizure recurrence and may need to start Anti-Seizure Medications (ASM) treatment. Children with first seizure presenting as status epilepticus, febrile seizures, and neonatal seizures are excluded.

The main differential when a child presents after a first non-prolonged, afebrile seizure(s), without significant reduced conscious level will be:

Afebrile Seizure(s) Could be:

- Epileptic seizure(s)
- Non-epileptic seizure(s)
- Acute symptomatic seizure(s)

DEFINITIONS

- **Unprovoked seizure**: seizure or seizure clusters occurring within 24 hours in a child >1 month of age, occurring in the absence of precipitating factor
- **Acute symptomatic seizures** (reactive seizures, provoked seizures, and situation-related seizures): seizures or seizure clusters associated with acute brain insult which may be due to infectious, toxic, metabolic, or traumatic cause. EEG can be normal.
- **Epileptic seizure** refers to the transient alteration of behavior due to abnormally excessive neuronal discharges in the brain.
- **Epilepsy** is a neurologic disorder characterized by enduring risk of having epileptic seizures with its associated neurobiological, cognitive, psychological, and social consequences.
- International League against Epilepsy (ILAE) task force new operational definition of epilepsy is a disease of the brain defined by any of the following conditions:
  - At least 2 unprovoked (or reflex) seizures occurring on 2 separate occasions
  - Presence of 1 unprovoked (or reflex) seizure and recurrence risk of ≥60% which is the same recurrence risk following 2 unprovoked seizures
  - Diagnosis of an epilepsy syndrome.
- **Seizure semiology** refers to the signs and symptoms of seizure.
  - **Focal (partial) seizures** originate from an epileptic network limited in one hemisphere which may either be discretely localized or more widespread.
  - **Generalized epileptic seizures** originate within a bilaterally distributed and rapidly engaging epileptic network.
- **Epilepsy syndrome** consists of combination of signs and symptoms that characterize an epileptic disorder and the diagnosis is based on clinical features including age of onset, seizure types and EEG findings
- **Etiology of epilepsy**: the cause of epilepsy
  - Structural/metabolic etiology (symptomatic etiology): due to a structural or metabolic condition of the brain that has been associated with predisposition of developing epilepsy
  - Genetic etiology (idiopathic, epilepsy): due to an underlying genetic defect(s)
  - Unknown etiology (cryptogenic etiology): due to causes not yet known

2. ASSESMENT

Assessment and management should occur concurrently if the child is actively seizing

3.1 Immediate stabilization of the child

- **A**irway
- **B**reathing
- **C**irculation
- **D**o not forget glucose
- Stopping of the active seizure (see Section 4.3)

3.2 Patient history and assessment of risk factors

- History and examination are fundamental to making an accurate diagnosis. Misdiagnosis is a major problem in children with seizures and epilepsies. A detailed clinical history should be obtained from the child (when possible) as well as directly from the person who witnessed the event. When a patient presents with an episode that is suspicious of a first unprovoked seizure, the first diagnostic step is to confirm the epileptic nature of the event. Episodes that mimic seizures are more common than epileptic seizures, but in most instances history and physical examination provide sufficient information to differentiate seizures from nonepileptic paroxysmal events.
- The following information should be pursued in all children presenting with a seizure.
    - Age
    - When it happened
    - Context in which the seizure happened
    - Sleep state
    - Presence, absence and nature of any trigger
    - Any pre-seizure symptoms reported by patient (dizziness, visual symptoms, auditory symptoms, epigastric sensations etc.)
    - Onset/beginning of seizure (any focal component noted, such as eye/head deviation to a side?). Sometimes seizures can start as focal and then soon gets generalized.
    - Seizure semiology
        - Nature of actual seizure including:
            - Motor component

        - Vocalizations
        - Degree of responsiveness
        - Any laterality
        - Eye/Head deviation
        - Duration and presence of multiple seizures in 24 hours
    - Post seizure details including
        - Drowsiness or confusion
        - Incontinence
        - Injury
        - Behavioural change
        - Any other features including headache, vomiting, weakness.
- Family history of arrhythmias, sudden death, faints, epilepsies etc.
- Presence of precipitating factors like fever, trauma, and electrolyte imbalance; if present, seizure is probably provoked
- Birth and perinatal history (e.g., history of prematurity, perinatal insult)
- Developmental history (presence of developmental delay and/or regression)
- Past medical history (e.g., history of meningitis, encephalitis, and remote symptomatic brain injury such as head trauma)
- Current medications and history of toxic ingestion

2.3 Physical and neurological examination

- Conscious level
- Full neurological examination looking for any abnormal neurological findings, signs of meningitis or raised intracranial pressure. See table 1.
- Cardiovascular examination including BP
- Head circumference
- Presence of dysmorphic features and neurocutaneous stigmatas
- Inability to return to baseline and presence of prolonged focal neurologic deficit (Todd's paralysis) may warrant neuroimaging and stat electroencephalography (EEG)

Red Flags

- Head injury with delayed seizure
- Developmental delay or regression
- Headache prior to the seizure
- Bleeding disorder, anticoagulation therapy
- Drug/alcohol use
- Focal signs

Table 1. History and physical examination findings that help characterize seizures

Predisposing factors	Pre-ictal semiology	Seizure semiology	Post ictal semiology
• Family history of seizures or epilepsy • Cognitive and developmental deficits • Precipitating events (trauma, fever, toxins, sleep deprivation, hyperventilation, flashing lights, etc.) • Preexisting structural brain lesion	• Aura (vision of lights or colors, epigastric rising sensation, etc.) • Behavioral changes (i.e., behavioral arrest/unresponsiveness or period of confusion) • Automatism (pill rolling, picking, lip smacking) • Tiredness • Irritability • Lack of appetite	• Order of appearance and duration of every semiologic component • Level of consciousness (ability to understand) • Motor activity (clonic, tonic, tonic clonic) • Sensory abnormality • Predominant side of occurrence of every component • Vocal output (cries, grunts, etc.) • Stereotypical facial expressions (facial slackening, eyelid fluttering, staring, or eye deviation) • Autonomic features (tachycardia, pallor, sweating, piloerection) • Incontinence • Respiration pattern • Falls or loss of tone • Total duration • Presence of rhythmicity and evolution in frequency of event	• Sleepiness • Amnesia • Confusion • Headaches • Partial paralysis • Muscular pain • Behavioral changes • Predominant side of every component • Presence of injury secondary to the seizure episode

3. DIFFERENTIAL DIAGNOSIS

Clinical setting	Cause
First seizure of epilepsy	• Idiopathic – (50% will have another seizure and then a diagnosis of epilepsy)
Acute symptomatic seizures/ Seizure secondary to other pathology	• Intracranial infection (bacterial/viral) • Metabolic (Check glucose, calcium, magnesium, sodium) • Ingestion of toxin • Trauma (Consider Non-accidental injury) • Intracranial tumors • Intracranial haemorrhage/TIA • Hypertension • Hydrocephalus
Neonatal / Early infant seizures	In addition to the above causes: • Hypoxic ischaemic encephalopathy (from birth) • CNS infections (acute and congenital) • Drug withdrawal • Fifth day fits • Additional metabolic causes; Pyridoxine and Biotin dependent
Non-epileptic events/ Seizure mimickers (Refer to appendix for detailed description)	• Breath-holding spells • Syncope • Sleep disorders • Panic attacks • Complicated migraines • Movement disorders • Psychogenic seizures • Gastro-esophageal reflux

4. MANAGEMENT

4.1 Initial support

- If a seizure occurred at home or at hospital setting for the first time, observation for 5 minutes is appropriate whilst waiting for seizure to stop spontaneously
- Start monitoring with pulse oximetry and apply oxygen if a child comes to hospital with a seizure
- Treat the child the way the parents will at home – keep safe and observe

4.2 Post seizure care

- Position child in recovery position (refer to patient information section), maintain airway
- Monitor for further seizure activity
- Consider investigations as appropriate

4.3 Active seizure flowchart

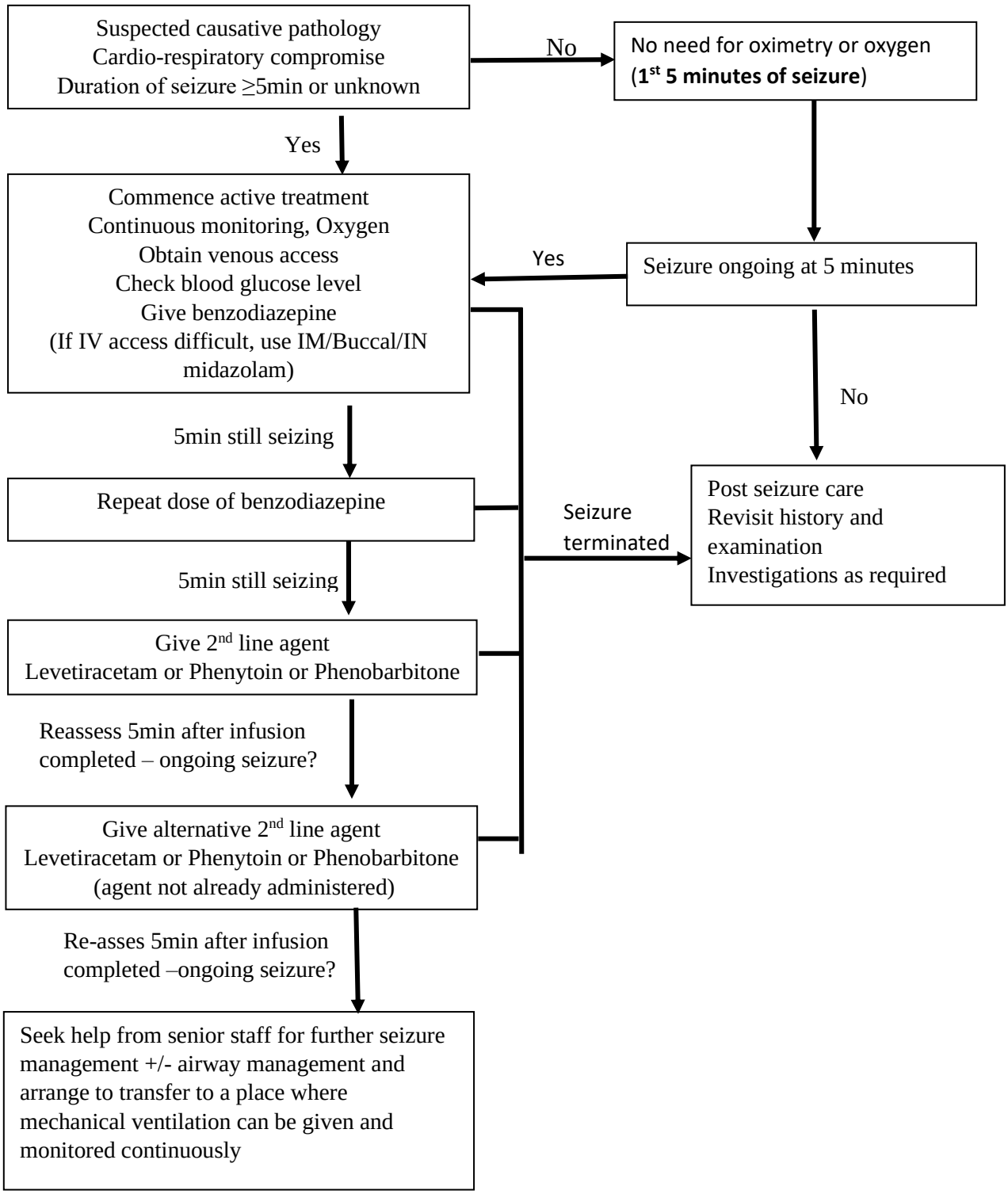


Table 2. Medications used in acute seizures

Medication	**Dose**	**Comments**
1st line		
Midazolam	0.15-0.2mg/kg IV/IM (Max 10mg) 0.3mg/kg buccal/IN (max 10mg)	
Diazepam	0.3mg/kg IV/IO (max 10mg)	IV dose preferable, do not give IM
2nd line		
Phenytoin (PHT)	Loading dose 20mg/kg IV/IO	Infuse diluted with NS (5mg/ml) into a large vein over 20min (max rate 50mg/min) in a monitored patient
Levetiracetam (LVT)	40mg/kg IV/IO (max 3g)	Dilute to 50mg/ml and infuse over 5min
Phenobarbitone (PB)	20mg/kg IV/IO (max 1g)	Dilute to 20mg/ml or weaker and infuse over 20min (max rate 30mg/min) in a monitored patient
3rd line		
Midazolam infusion	1mcg/kg/min	
Ketamine	1-2mg/kg	
Propofol	2.5mg/kg IV/IO stat followed by infusion at 1-3mg/kg/hr.	For refractory seizures requiring rapid sequence induction and ventilation. Use only with involvement of senior staff confident with airway management. Beware hypotension.
Thiopentone	2-5mg/kg IV/IO slowly stat followed by infusion at 1-4mg/kg/hr.	
Pyridoxine	100mg IV	Consider in children up to 6 months with seizures refractory to standard anticonvulsants

4.4 Criteria for consideration of admission of child after a first afebrile seizure

Category	Criteria / Signs
Age	Consider if no clear diagnosis in all, but especially children under 24 months
Neurological	Glasgow coma scale (or equivalent) <15 (>1 hour post fit) New neurological signs
Signs of raised intracranial pressure	Papilloedema Tense fontanelle
Generally unwell	Irritable, disinterested, vomiting
Signs of meningitis	Kernig's positive Photophobia Neck stiffness
Seizure type	Prolonged seizure (>15 minutes) Focal features Recurrent
Signs of aspiration	Respiratory distress Need for oxygen
Parental or carer anxiety	Remember that seizures are worrying to parents and carers.
Unsure of diagnosis	If you are not happy then consider admission for further observation.

5 INVESTIGATIONS

5.1 Bloods

- Blood glucose should be performed as soon as possible
- Consider FBC, electrolytes, calcium, magnesium, and venous gas in the following circumstances:
    - Any seizure needing a second line agent
    - Children <18 months
    - Medical comorbidity such as metabolic disorder, diabetes, dehydration
    - Child has not returned to baseline once the post-ictal phase and the effect of any medication has passed
- Urine toxicology in suspicious patients

5.2 Electrocardiogram (ECG)

- All children with convulsive seizures should have a 12 lead ECG recorded with calculation and documentation of QTc (Corrected QT interval) to look for evidence of cardiac disease. Prolonged QTc may indicate long QT syndrome.
- Children with arrhythmias or other causes of syncope can present with convulsive syncopal seizures that mimic epileptic seizures.

5.3 Electroencephalography (EEG)

- EEG lack sensitivity and specificity. 10% of children without epilepsy have abnormalities on EEG, while 50% of EEG's performed in children with epilepsy are normal.
- There are times when an EEG may be required. This should be discussed with the consultant. This includes concerns about epileptic spasms, focal seizures or to make an epilepsy syndrome diagnosis.
- Helps classify seizure type, epilepsy syndrome and predict recurrence.
- EEG with sleep deprivation is recommended to increase the sensitivity.
- Urgent EEG should be done if the patient has not returned to baseline or if subclinical seizure is suspected.

5.4 Imaging

Neuroimaging is not routinely recommended following a first afebrile seizure.

- Same day neuroimaging: Head computed tomography (CT), the preferred method in urgent cases: persistent neurological or focal abnormality & if seizure could be related to hydrocephalus, intracranial bleeding, traumatic brain injury, encephalitis, intracranial abscess, raised intracranial pressure, unexplained encephalopathy, brain tumor.
- Urgent MRI brain: focal features with full neurological recovery
- Outpatient brain magnetic resonance imaging (MRI) is the imaging of choice in the following cases:
    - Infants and children without feature characteristic of idiopathic focal or generalized epilepsy
    - Presence of focal seizures, focal neurologic deficits, neurocutaneous stigmatas, clinically significant developmental delay, or regression
    - For any child <2 years old with seizures
- Non-urgent neuroimaging study could be deferred to the next several days or later.

5.5 Lumbar puncture

- Indicated if there is a concern of possible meningitis or encephalitis. If increased intracranial pressure is suspected, the LP should be preceded by an imaging study of the head. A normal CT scan does not rule out acutely raised ICP.

6 REFERRAL

6.1 Consider consultation with Paediatric team/Paediatric neurology if

- Focal seizures or post-ictal findings
- Developmental delay/regression
- Existing comorbidities

6.2 Consider transfer to tertiary centre when

- Children anticipated to require ICU level care (cardiorespiratory compromise)
- Children <6m
- Status epilepticus

- Incomplete recovery
- Recurrent seizure without a diagnosis of epilepsy

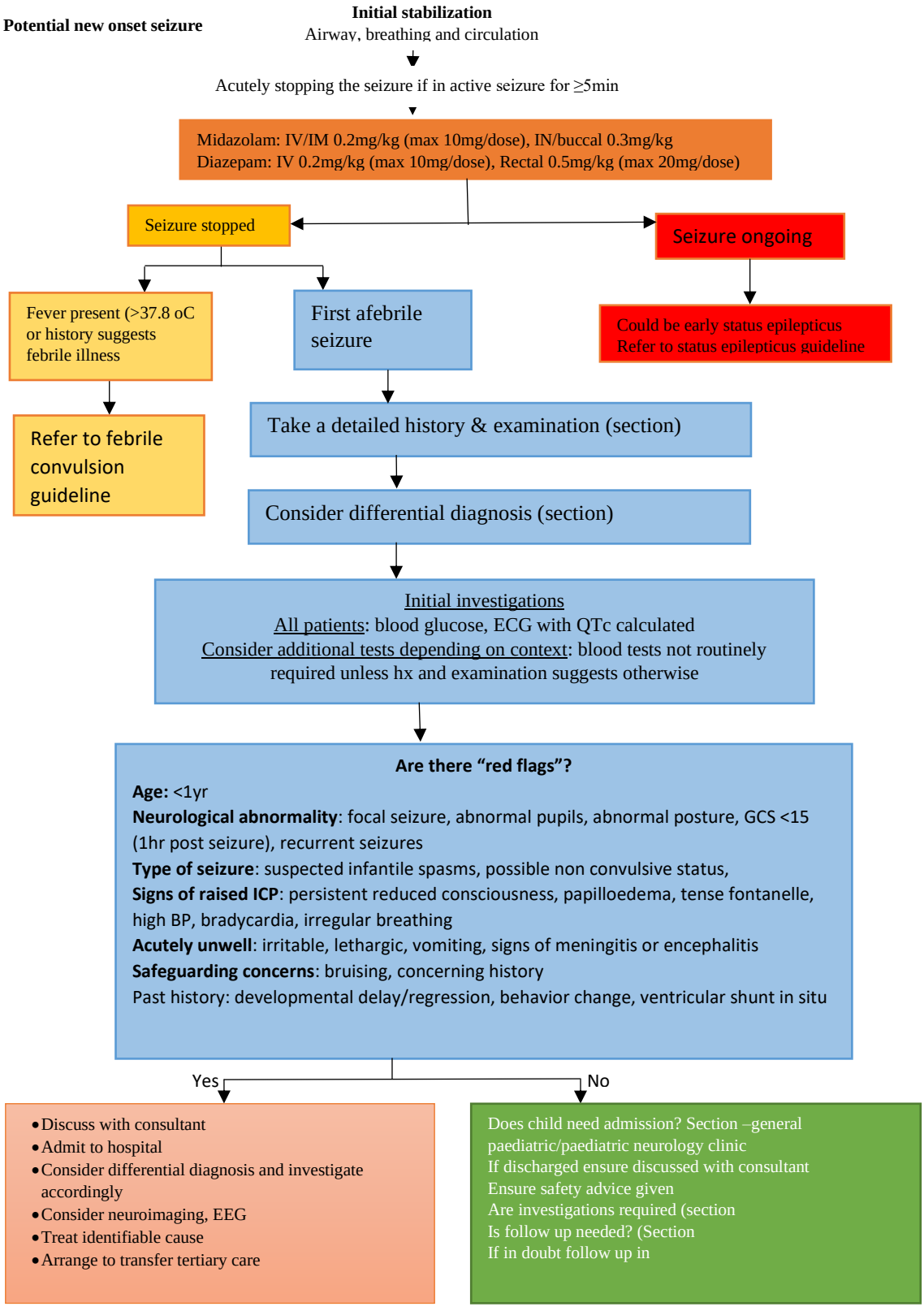
7 DISCHARGE CRITERIA

- In older children, when the child is back to baseline function with no red flags on history, examination or presumed cause
- All families should receive education prior to discharge which includes:
    - Explanation of risk of recurrence
    - Seizure first aid and management plan
    - Advise parents to video events if safe to do so and keep a record
    - Provide written information
    - Consider need for emergency medication (buccal midazolam)

8 FOLLOW UP AFTER A FIRST UNPROVOKED SEIZURE

- All children who have a first afebrile seizure should have medical follow up, preferably with paediatric neurology
- Treatment with antiepileptic drug is NOT indicated in all patients with a first afebrile seizure as it does not prevent development of epilepsy or influence long term remission.

9 ALGORITHM FOR MANAGEMENT OF 1ST UNPROVOKED SEIZURE IN CHILDREN



10 PARENT INFORMATION SHEET

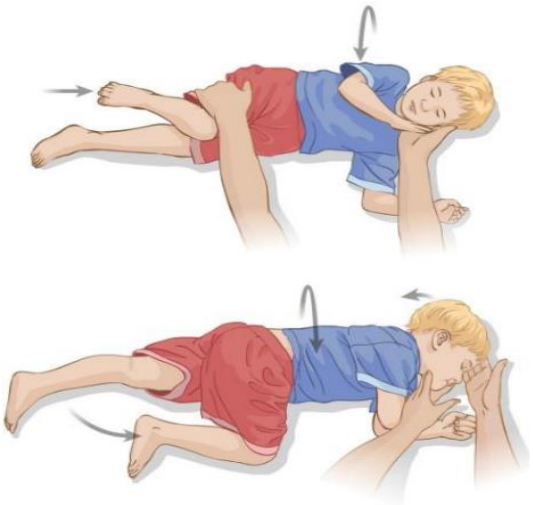
- First aid for a convulsive seizure
- A convulsive seizure is where the child is stiff or shaking. The information below can help you to focus when your child is having a seizure. It can help you to give first aid to keep them safe.

10.1 What is to be done during active seizure

- Stay calm
- Protect them from injury (remove harmful objects from nearby)
- Cushion or gently hold your child's head to protect them from head injury
- Note the date and time the seizure started – if stiffness and / or jerking continues for 5 minutes or more you should call for an ambulance
- Turn your child onto their side, into the recovery position, as soon as you are able (as shown in Image below). This can help with their breathing and help if they vomit or have other types of fluid in their mouth. Some noisy breathing and slight colour change are common
- If possible, try to video the seizure on a mobile phone as it can provide a lot of useful information to your child's doctor or nurse. Video can help confirm the type of seizure which then helps decide which tests and treatment may be needed. Try to capture the whole child in the video, say out loud what you are seeing and show how they respond to you
- Stay with your child until they are fully recovered
- Your child may be confused, drowsy or fall asleep after a seizure – reassure them if they are confused, let them rest or sleep if they are drowsy, make sure you keep an eye on them until they are fully recovered

10.2 What is not to be done during active seizure

- Restrain or restrict your child's movements
- Move your child unless they are in danger
- Put anything in their mouth
- Give your child anything to eat or drink until they have fully recovered



Courtesy of www.aboutkidshealth.ca
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Image 1: Moving a child into the recovery position

10.3 Actions to be careful after the first seizure

- It is important to let your child go back to nursery or school and enjoy their normal hobbies and activities.
- As your child has had a seizure recently, it is important to take extra care with some activities until your child has had their initial assessment. Each of these activities should be reviewed over time:
- Climbing: Your child should not climb anything taller than their own height unless they are wearing a harness and being supervised

- Cycling: Your child can still ride a bicycle or scooter, but they should wear a helmet and you should consider whether they are allowed to ride on roads or need to be supervised
- Swimming: Your child can still go swimming and do water sports as long as they are supervised at all times by a responsible person
- Driving: Older teenagers who hold a driving license have a legal responsibility to stop driving and tell the Driver and Vehicle Licensing Agency that they have had a seizure

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4. ފިޓުޖެހުން ފެށުނު ގަޑި އާއި ޚަތިމުވި ގަޑި ނޯޓުކޮށްލުން - މިނިޓެއް ނުވަތަ އެއަށްވުރެ ގިނައިރު ކުއްޖާ ހަރުދަނޑިވެ ނުވަތަ ތެޅިފޮޅުމުން ނުހުއްޓި ދިގުދެމިގެންދާނަމަ ވީއެންމެ އަވަހަކަށް އެމްބިއުލަންސް އަށް ގުޅުއްވުން.

5. ވީ އެންމެ އަވަހަކަށް ކުއްޖާ ވާތު ފަރާތަށް އަނބުރާލާ (ރިކަވަރީ ޕޮޒިޝަނަށް، ތިރީގައިވާ ފޮޓޯއިން ދައްކުވައިދީފައިވާ ގޮތަށް) މިއީ ކުއްޖާގެ ނޭވާލުމަށް އެހީތެރިވުމާއި އަދި ކުއްޖާ ހޮޑުލާނަމަ ނުވަތަ އަނގައިން ފޮނު އަރަނީނަމަ އެ ސާފުވުމަށް އެހީތެރިވެދޭނެއެވެ. ނޭވާލާއިރު ކޮންމެވެސް ވަރަކަށް އަޑު ގަދަވުމާއި ކުއްޖާގެ ކުލަ ކުޑަކޮށް ބަދަލުވުމަކީ އާންމުކޮށް ދިމާވާކަމެކެވެ.

6. ފިޓްސް ހިފައިފައި އޮތްއިރު ކުއްޖާގެ ވީޑިއޯއެއް މޯބައިލް ފޯނުން ނެގުމަކީ ވީޑިއޯ ކުރުމަށްފަހު ކުއްޖާއަށް ފަރުވާދޭ ޑޮކްޓަރަށް ދެއްކުމަކީ މުހިންމު ކަމެކެވެ. މީގެ ސަބަބުން ކުއްޖާގެ ފަރުވާއަށް ބޭނުންތެރި ގިނަ މަޢުލޫމާތު ލިބިގެންދާނެއެވެ. ވީޑިއޯއިން ކުރިންނަށް ޖެހޭ ފިޓްސްގެ ބާވަތް ކަނޑައަޅައިދިނުމުގައި އެހީތެރިވެދެއެވެ. އަދި ކުއްޖާގެ ފަރުވާއަށް ބޭނުންވާނެ ޓެސްޓްތަކާއި އަދި ކުއްޖާއަށް ބޭނުންވާ ފަރުވާ ދިނުމަށްވެސް ވީޑިއޯއިން އެހީތެރިކަން ލިބޭއެވެ. ކުއްޖާ އެކަނި ދޫކޮށް ގޮސް ވީޑިއޯ ކުރުމެއް ނުކުރަންވާނެއެވެ. އަދި، ކުއްޖާގެ ހާލަތު ބަލަހައްޓަން ކުއްޖާ އަށް ފުރުސަތު ނެތި އެއްކޮށް ހުރެ ބޭރު ކުއްޖާ ސަލާމަތްކުރަންވާނެއެވެ.

7. ކުއްޖާ އެއްކޮށް ހޭލުންތެރިކަން އަނބުރާލިބެންދެން ކުއްޖާއާ އެއްކޮށް ހުންނަންވާނެއެވެ.

8. ފިޓް ޖެހުމަށްފަހު ކުއްޖާ އަށް ވަރުގާ ނޭނގުމާއި، ވަރުބަލިވެ ނިދި އައުން އާދައިގެންވާއެވެ. ފިޓްޖެހުމަށްފަހު ކުއްޖާ ވަރުގާ ނޭނގޭ ކަހަލަ ގޮތަކަށް ހުންނަނަމަ ހަމައެކަނި އަތުގައި ދިޔުމާއި ވަރުބަލިވެ ނިދި އައިސް ހުންނަނަމަ އަރާމުކުރުމަށް ބާއްވާ ބަލަންވާނެއެވެ. އަދި ކުއްޖާ އެއްކޮށް ރަނގަޅުވުމަށް ކުއްޖާއަށް ވަރުގާ ބަލަން ސަމާލުކަން ދީގެން ކައިރީގަ ހުންނަންވާނެއެވެ.

ކުޑަކުއްޖަކަށް ފިޓްޖެހުމުން ތިރީގައި މިވާ ކަންކަން ނުކުރުން އެދެވިގެންވެއެވެ.

1. ކުއްޖާގެ ހަރަކާތްތައް ހުއްޓުވަން ބާރަށް ހިފެހެއްޓުން.
2. ކުއްޖާ ވެއްޓި އަނގައިން ލިބުނު ތަކެއްޗާއި ނުވާނަމަ އެހެން ތަކެތި ގެންދިޔުމަށް މަސައްކަތްކުރުން.
3. އެއްވެސް އެއްޗެއް ކުއްޖާގެ އަނގައަށް ލެއްވުން.
4. ކުއްޖާ އެއްކޮށް ހޭލުންތެރިކަން އައިސް ރަނގަޅުވުމުގެ ކުރިން އެއްވެސް އެއްޗެއް ކާން ނުވަތަ ބޯންދިނުން.

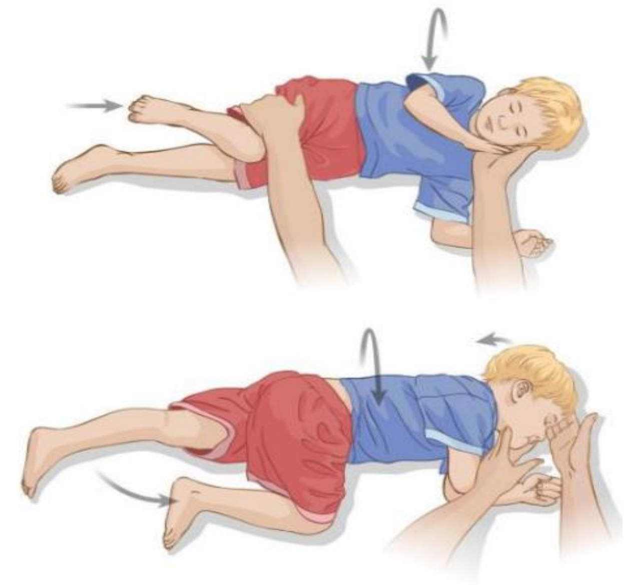

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Image 1: Moving a child into the recovery position

ކުއްޖަކަށް ފުރަތަމަ ފަހަރަށް ފިޓުޖެހުމުން އާންމު ދިރިއުޅުމުގައި ސަމާލުކަންދޭންވީ ކަންކަން.

ފިޓުޖެހުމަށްފަހު ކުއްޖާ އާންމު ހާލަތަށް އައުމުން ސްކޫލަށް ދިއުމާއި، ކުއްޖާ ސްވިމިންގާ އެހެނިހެން ކަންކަމުގައި އުޅުން ފުރުސަތު ހޯދައިދިނުމަކީ މުހިންމު ކަމެކެވެ. އަދި ކުއްޖާއަށް ފިޓުޖެހުމަށްފަހު ހަދަންޖެހޭ ފުރަތަމަ އެސެސްމަންޓް ހެދުމުން ކުއްޖާގެ ޢުމުރާ ބައްޔާ ކަންކަންހުރުމުގައި ކުއްޖާ އަށް ހާއްސަ ސަމާލުކަން ދިނުމަކީ މުހިންމު ކަމެކެވެ. މިކަންކަން ކުރުމުގައި ކުއްޖާ އުޅޭގޮތް ބަލައި ބޭނުންކުރަންވާނެއެވެ.

1. **އުސް ތަންތަނަށް އެރުން:** ކުއްޖާގެ ހަމައެކަނި އިސްކޫލަށްދާއިރު އުސް އެއްވެސް އެއްޗަކަށް މީހެއްގެ ބެލުމުގެ ދަށުން އަދި ވެއްޓުން ނަގަވެސް ގެއްލުންނާ ފެދޭ އެއްޗެހި އަރައިގެން ހުރެ ނޫން ގޮތަކަށް އުސްތަންތަނަށް އަރުވާގެ ފުރުސަތު ދިނުން ނުވާނެއެވެ.
2. **ބައިސިކަލު ދުއްވުން:** ކުއްޖާ ބައިސްކަލެއް ނުވަތަ ސްކޫޓަރެއް ފަދަ އެއްޗެއް ދުއްވި ނަގަވެސް ހެލްމެޓް އަޅައިގެން ދުއްވުމާއި އެފަދަ ތަކެތި ދުއްވާއިރު ބޮޑެތިމީހެއްގެ ބެލުމުގެ ދަށުން އެކަން ކުރުން.
3. **ފެތުން:** ފިޓު ޖެހުމަށްފަހުވެސް ޖިސްމާނީގޮތުން މީހެއްގެ ބެލުމުގެ ދަށުން ކުއްޖާ ބެލުމުގެ ދަށުންނަމަ ފަތަން ގޮސް އަދި ހުޅު ކުޅިވަރުތަކުގައިވެސް އުޅެވޭނެއެވެ.
4. **ދުއްވުން:** ޑްރައިވިން ލައިސަންސް ހޯދަނީ ފުރާވަރުގެ ކުރިން އިންޓިނޮލީ އުޅަނދު ފަހަރު ނުދުއްވުން އެދެވިގެންވެއެވެ.

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12. APPENDIX

Table 3. Main Differential Features of Seizures, Syncope, and Psychogenic Nonepileptic Seizures

Events in the history that are suggestive of	Before the event	During the event	After the event
Epileptic seizures	• Sleep deprivation • Toxic exposure • Toxic withdrawal • Exposure to lights or sounds • Sensory aura • Epigastric rising sensation • Hallucination	• Stereotyped • Lack of response to stimuli • Automatisms • Eyes generally opened; if closed, there is no resistance to passive opening • Hypersalivation • Incontinence • Short duration (1 min or less) • Vocalization, if present, consists of simple sounds (crying)	• Prolonged period of altered consciousness (sleepiness, confusion, etc.) until complete recovery • Relatively frequent traumatic injury • Tongue biting relatively frequent and present in the lateral side of the tongue • There is no recall of the episode or the peri-ictal period • Breathing is frequently deep and prolonged
Syncope	• Emotional stress • Prolonged standing • Dehydration, hunger, pain • Carotid sinus stimulation • Elevated intrathoracic pressure (Micturition, cough	• Pallor • Sweat • Repeated movements, if present, occur once on the floor, not while standing • Brief loss of consciousness • Incontinence may occur	• Uncommon postictal headache or postictal confusion • Rapid and complete return to baseline • Infrequent traumatic injury • Recall of the period around the episode • Tongue biting typically midline or at the tip of the tongue
Psychogenic nonepileptic events	• Appearance in a particular context (presence of witnesses, presence of significant others, emotions) • Trance, dreamlike state	• Out-of-phase motor activity • Vocalization of complex and purposeful sounds (words) • Forceful closure of the eyes with resistance to passive eye opening • Fluctuating course • Violent movements	• Inconsistent state of altered consciousness (sleepiness, confusion, etc.) • Shallow and rapid breathing • Recall of the episode • Correct but partial and feeble motor responses

	• Distortion of perception • Sensation of death • Gradual onset	• Long duration (generally more than 1 minute) • Trashing and grabbing behavior • Pelvic thrusting • Semi purposeful, goal-directed movements • Confused staring • Response to stimuli • Directed rage	

Table 4. Common seizure mimics

Common Seizure mimics	Age of onset	Clinical features	Features distinct from Seizure
Syncope	Peak 15-19, F>M	• Prodrome (light headed, fading of visual and auditory sensations, muffled hearing, tunnel vision) • Autonomic features (diaphoresis, pallor, generalized weakness, nausea, epigastric discomfort) • Incontinence and tongue biting may be present • Abnormal movements mimicking seizures are common	• Episode lasts seconds and recovery is rapid • Tongue biting may be central • Lack of postictal state • Pallor • Abnormal movements mimicking seizure seen after supine • Injury is rare due to prodrome • Absence of persistent neurologic findings
NES (NES and epileptic seizures oftentimes coexist)	Child to adolescent	• Psychogenic factor prior to event may be apparent • Prior history of abuse or exposure to seizure • Events may appear bizarre and will fluctuate	• Eye closure • Lack of postictal state • Out-of-phase limb movements • Response to stimulation • Fluctuating semiology/ symptomatology (unlike FLE, which may appear bizarre but are stereotyped)
Sleep disorders	Early childhood to adolescence	• Parasomnias REM disorders (occur later in sleep) -Nightmares -Sleep paralysis	NFLE should be considered NFLE may occur at any time of the night, the events are stereotyped, multiple, and tend to cluster

		NREM disorders (lack of awareness & recollection) (First third of the night) -Confusional arousals -Night terrors • Sleep-related movement disorders PLMS Sleep bruxism • Other Sleep myoclonus	• The distinction may be difficult as the EEG may be normal • Hyper motor semiology may be seen in both parasomnias and FLE (bicycling, pelvic thrusting, dystonic posturing) • Sleep myoclonus seen typically in transition to sleep, often multifocal, sporadic without evolution
Breath-holding spells (Spontaneous resolution is typical and reassurance is key)	Toddler age group	• Pallid breath holding -Unpleasant stimulus -Crying is not component - Limp and lifeless -Pallor & diaphoresis are key -Confusion and distress precede falling asleep • Cyanotic breath holding -Unpleasant stimulus -Crying -Child exhales and does not inhale -Cyanosis is prominent	• History of crying and unpleasant stimulus is key • Aftermath of the events may mimic postictal state • Symmetric jerking and eye deviation may be seen
Gratification disorders/ self-stimulation	Toddler age group (F>M)	• Behavioral arrest • Awake state • Scissoring of lower extremity • Panting and facial flushing may be apparent • Rash/eczema may be present	• Lack of true postictal state • Often able to regain attention with stimulation
Reflux	Infancy to early childhood	• Dystonic movements • Back arching • Cyanosis	• Feeding history is key (although not always clearly Associated, events may be seen hours after feeding) • Recurrent regurgitation • Failure to thrive