Clinical Practice Guidelines: Neurological/Seizures

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Purpose	To ensure consistent management of patients with seizures.
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless stated otherwise.
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Seizures

A **seizure** is defined as a transient disturbance of cerebral function caused by abnormal neuronal activity in the brain.[1] Patient presentation may range from obvious convulsions to abnormal behaviours or subjective experiences.

Epilepsy is a disorder of brain function that takes the form of recurring seizures and is due to many diverse aetiologies.[2]

Seizures can broadly be characterised as ***focal*** or ***generalised***.

Focal seizures – where the abnormal neuronal activity originates and is limited to one hemisphere of the cerebral cortex.[3,4] Seizure symptoms are representative of the area of the cerebral cortex where the abnormal neuronal discharge exists. Focal seizures can evolve to become bilateral convulsive seizures.

- *Focal* – seizure activity that does not impair awareness or responsiveness.
- *Focal dyscognitive* – seizure activity where the level of awareness or responsiveness is reduced but full consciousness is not lost.

Generalised seizures – where the abnormal neuronal activity rapidly engages both hemispheres of the cerebral cortex.[3,4] Several types of generalised seizures exist:

- *Absence* – brief loss of awareness and responsiveness (usually < 10 seconds) with no post-ictal phase.
- *Atonic* – sudden loss of muscle tone that (usually lasts < 2 seconds) and results in a sudden fall.
- *Tonic* – sudden increased muscle tone that most often occurs in clusters during sleep (usually lasts seconds to minutes).
- *Myoclonic* – a brief, sudden jerking action of a muscle or muscle group (lasting milliseconds only) that may occur in a series leading into a tonic clonic seizure.
- *Tonic clonic* – an abrupt loss of consciousness that is concurrent with involuntary muscular contractions (tonic phase) followed by symmetrical jerking movements (clonic phase). Typically lasts for 1–3 minutes after which the patient experiences a post-ictal period.

Status epilepticus – is a medical emergency defined as seizure activity > 5 minutes in duration or recurrent seizure activity where the patient does not recover to a GCS of 15 prior to another seizure.[5]

Seizure triggers in epilepsy include:

- Lack of sleep, stress
- Sudden stopping or changing medications
- Fever, infection
- Diarrhoea and vomiting, dehydration
- Alcohol/Illicit drug use
- Menstruation
- Photosensitivity
- Extreme temperatures, particularly heat
- Electrolyte disturbances.

Psychogenic non-epileptic seizures (PNES) – previously known as pseudoseizures, are episodic behavioural events that mimic seizure activity but are not epileptic seizures.[6] PNES arise due to different factors in different individuals. If doubt exists to seizure causation, the administration of midazolam is appropriate.[7]

Provoked seizures – result from a recognisable cause.

Examples include:

- Hypoxia and hypercarbia
- Hypotension
- Metabolic (hypoglycaemia, hyponatraemia, hypocalcaemia, hyperthyroidism, uraemia)
- Pregnancy – eclampsia
- Meningitis/encephalitis
- Hyperthermia/febrile convulsions
- Drugs/toxins (intoxication/withdrawal)
- Cerebral pathology (e.g. tumour, stroke, trauma).

Clinical features

Typical presentations in seizures[2]

- Visual hallucinations
- Localised twitching of muscles without impaired consciousness
- Localised tingling and numbness
- Nonsensical speech
- Disorientated movements
- Sudden pause in activity or fixed gaze
- Nystagmus
- Automatism
- Increase or loss of tone
- Alternating tonic/clonic posturing
- Incontinence
- Post-ictal: confusion, fatigue, headache, nausea

Prolonged seizures or status epilepticus are associated with:

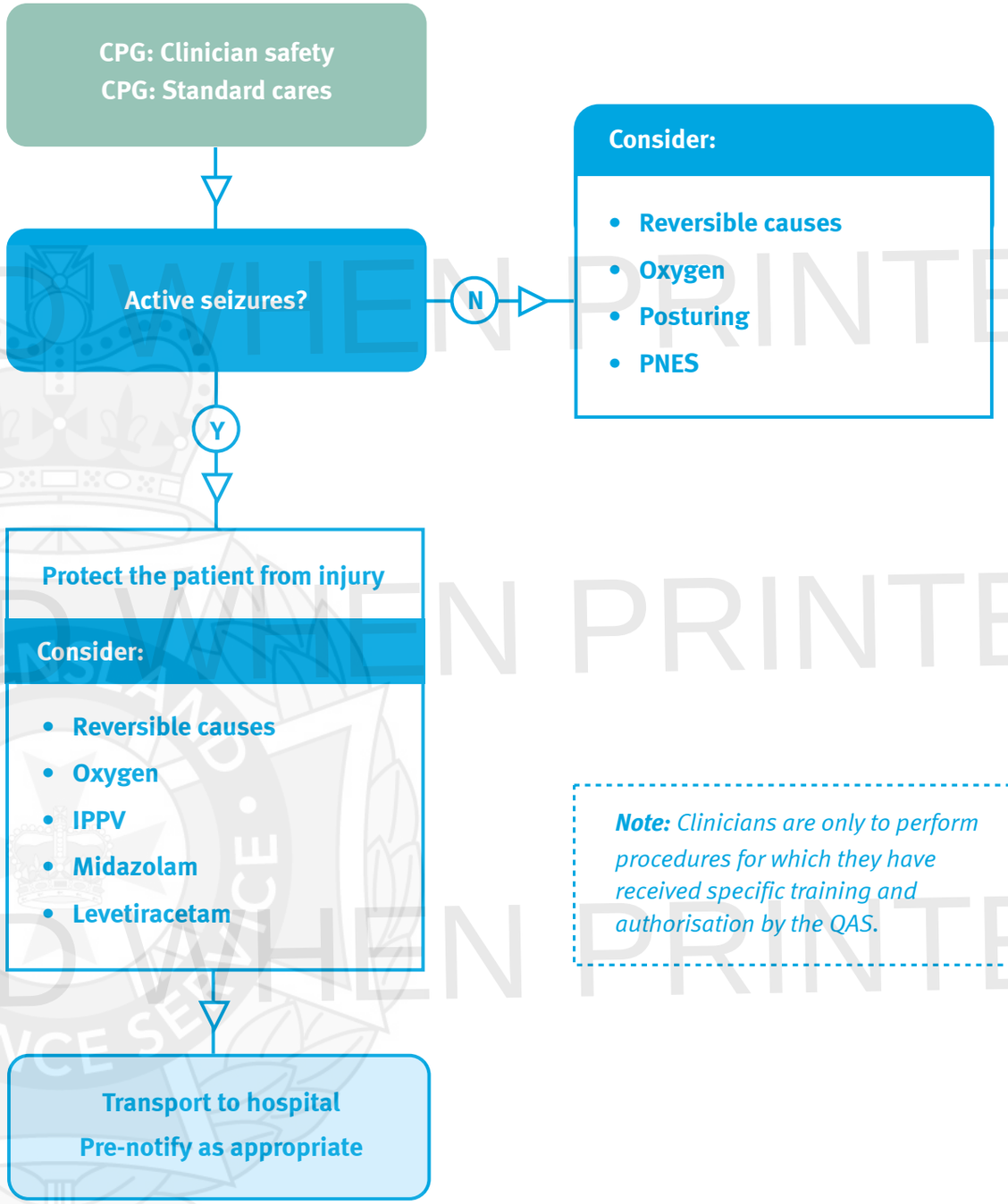
- Hypoxia, hypercarbia
- Progressive lactic and respiratory acidosis
- Hyperthermia, hypertension, tachycardia
- Hypo/hyperglycaemia
- Hyperkalaemia.

Risk assessment

- Nil in this setting

Additional information

- Patient history should include any causes, past history, duration of seizure, and whether or not it had a focal onset and if so the features of the focal onset.
- Provoked seizures require concurrent treatment of both the seizure and the underlying cause.
- Focal seizure activity in a patient who is unconscious or has an ALOC with GCS ≤ 12 should be managed as a generalised seizure. For patients with a GCS > 12, officers should discuss treatment options with the *QAS Clinical Consultation and Advice Line*.
- Seizure activity may manifest differently in children,[8] including:
  - Vacant stare
  - Lack of gross muscle tonicity
  - Nystagmus, lateral fixed gaze and/or facial muscle twitching.



Note: *Clinicians are only to perform procedures for which they have received specific training and authorisation by the QAS.*