

## Status Epilepticus

### Definition of status epilepticus

- Status epilepticus is when a seizure continues for longer than five minutes or when multiple shorter seizures occur with incomplete recovery between them
- Refractory status epilepticus is defined as persistent seizures despite two adequate doses of intravenous (IV) anti-convulsant agents

### Causes of status epilepticus

- Known epilepsy
  - Drug withdrawal, non-compliance or therapy alteration
  - Inter-current illness
  - Metabolic derangements
  - Seizure threshold-lowering drugs
- No history of epilepsy
  - Drug overdose
    - E.g. amphetamines, tricyclic antidepressants (TCAs)
  - Drug withdrawal
    - E.g. alcohol
  - Central nervous system (CNS) injury
    - Traumatic brain injury (TBI)
    - Acute stroke
    - Subarachnoid haemorrhage (SAH)
    - Cerebral hypoxia
  - CNS infection
    - Meningitis
    - Encephalitis
    - Cerebral abscess
  - Metabolic derangements

### Clinical features of status epilepticus

- Witnessed or unwitnessed
  - Collateral history if possible
- Prodrome
- Loss of consciousness
- Convulsions
- Tongue biting
- Urinary incontinence
- Post-ictal period
- Injuries

### Initial investigation of status epilepticus:

- Glucose
- Venous blood gas (VBG)
- Full blood count
- Urea & electrolytes
- Magnesium
- Calcium

### Further investigation of status epilepticus:

- Guided by the likely cause but may include
  - CT head
  - Bloods cultures
  - Toxicology screen
  - Lumbar puncture (LP)
- 12 lead electrocardiogram (ECG)
  - Look specifically for prolonged PR, QRS and QT interval

### Initial management of status epilepticus:

- On recognition of a tonic-clonic seizure, instruct nursing staff to prepare lorazepam 4 mg IV in 4 ml of 0.9% saline (1mg/ml) with a 10 ml 0.9% saline flush and start the clock
- Remove any objects in the immediate environment on which the patient might injure themselves
- Roll the patient on to their side whilst supporting the airway with a jaw thrust
- Insert a nasopharyngeal airway and provide high-flow oxygen
  - Do not use an oropharyngeal airway (OPA). Due to trismus, insertion is unlikely to be successful and may result in the OPA shattering within the patient's mouth
- Attach monitoring
  - Pulse oximetry
  - Non-invasive blood pressure
  - Three-lead cardiac monitoring
- Check capillary blood glucose
  - Treat hypoglycaemia if present; options are:
    - Dextrose 50% 50 ml IV
    - Dextrose 20% 100 ml IV
    - Dextrose 10% 250 ml IV
    - Glucogel/Hypostop if IV access still not available
- Obtain intravenous (IV) access if not already secured and take bloods
- Correct any electrolyte abnormalities
- Give Pabrinex 2 pairs IV if there is any history of alcohol misuse or poor nutritional status
- **Within five minutes:** Give the first dose of benzodiazepine unless given already (e.g. pre-hospital) in which case, proceed to the next step
  - If IV access available, give up to 4 mg of lorazepam IV in 1 mg boluses titrated to effect
  - The goal is to give the patient just enough lorazepam but no more, thereby terminating the seizure but not leaving them excessively obtunded
  - If IV access is unavailable, give diazepam 10 mg per rectum (PR) or midazolam 10 mg buccal and keep trying to obtain IV access
  - Interosseous (IO) access may be needed if IV cannot be obtained
  - Consider the next steps. Is this a patient who may need intubation?
    - If so consider calling the anaesthetist now.
- **Ten minutes after first benzodiazepine:** give second dose of benzodiazepine unless given already (e.g. pre-hospital) in which case, proceed to the next step:
  - If IV access available, give up to 4 mg of lorazepam IV in 1 mg boluses titrated to effect
  - If IV access is unavailable, give diazepam 10 mg per rectum (PR) or midazolam 10 mg buccal and keep trying to obtain IV access
  - Ask the nursing staff to prepare phenytoin 18 mg/kg IV or phenobarbital 20 mg/kg IV if patient normally takes oral phenytoin
- **Ten minutes after second benzodiazepine**
  - Request senior help if not already present and give phenytoin or phenobarbital as appropriate

- Phenytoin 18 mg/kg IV or phenobarbital 20 mg/kg IV if patient normally takes oral phenytoin
  - Contact the on-call anaesthetist and inform the intensive care unit (ICU)
- **15 minutes after third agent (i.e. after maximum of 40 minutes since status began)**
  - Give a rapid sequence induction (RSI) with thiopental and transfer to ICU

#### Further management of status epilepticus:

- Correct any electrolyte abnormality
- CT head if first presentation, not done previously, clinical features suggests new neurology, or if precipitated by TBI
- Bloods cultures
- Toxicology screen
- Lumbar puncture (LP)
- 12 lead ECG
  - Look specifically for prolonged PR, QRS and QT interval
- Electroencephalogram (EEG)
- If first presentation, referral to first fit clinic

#### Common questions concerning status epilepticus:

- Define status epilepticus
  - Status epilepticus is when a seizure continues for longer than five minutes or when multiple shorter seizures occur with incomplete recovery between them
- Give four causes of status epilepticus in an individual with epilepsy
  - Drug withdrawal, non-compliance or therapy alteration
  - Inter-current illness
  - Metabolic derangements
  - Seizure threshold-lowering drugs
- Give four causes of status epilepticus in an individual with no history of epilepsy
  - Drug overdose e.g. amphetamines, tricyclic antidepressants (TCAs)
  - Drug withdrawal e.g. alcohol
  - Central nervous system (CNS) injury
  - CNS infection
- What features in the history would suggest a seizure as opposed to an alternative cause of transient loss of consciousness?
  - Previous history
  - Convincing prodrome
  - Tonic-clonic convulsions
  - Tongue biting
  - Urinary incontinence
  - Post-ictal period
- On recognition of a seizure, outline your initial management steps
  - Instruct nursing staff to prepare lorazepam 4 mg IV in 4 ml of 0.9% saline (1mg/ml) with a 10 ml 0.9% saline flush and start the clock
  - Remove any objects in the immediate environment on which the patient might injure themselves
  - Roll the patient on to their side whilst supporting the airway with a jaw thrust
  - Insert a nasopharyngeal airway and provide high-flow oxygen
  - Attach monitoring (pulse oximetry, non-invasive blood pressure, three-lead cardiac monitoring)
  - Obtain IV access and take bloods
- What metabolic condition must be promptly excluded and what are the options for its rapid

correction

- Hypoglycaemia
  - Dextrose 50% 50 ml IV
  - Dextrose 20% 100 ml IV
  - Dextrose 10% 250 ml IV
  - Glucogel/Hypostop if IV access still not available
- If after a maximum of five minutes the seizure has not terminated, what treatment is indicated and what are the options for giving this?
  - Give the first dose of benzodiazepine
  - If IV access available, give up to 4 mg of lorazepam IV in 1 mg boluses titrated to effect; the goal is to give the patient just enough lorazepam but no more, thereby terminating the seizure but not leaving them excessively obtunded
  - If IV access is unavailable, give diazepam 10 mg per rectum (PR) or midazolam 10 mg buccal and keep trying to obtain IV access
- If this had already been given, how would this change your management?
  - Do not give more than two doses of benzodiazepine so if already given, proceed to the next step
- If ten minutes later (i.e. after 15 minutes) the seizure has not terminated, what treatment is indicated and what are the options for giving this?
  - Give the second dose of benzodiazepine
  - If IV access available, give up to 4 mg of lorazepam IV in 1 mg boluses titrated to effect; the goal is to give the patient just enough lorazepam but no more, thereby terminating the seizure but not leaving them excessively obtunded
  - If IV access is unavailable, give diazepam 10 mg per rectum (PR) or midazolam 10 mg buccal and keep trying to obtain IV access
- If ten minutes later (i.e. after 25 minutes) the seizure has not terminated, what treatment is indicated?
  - Phenytoin 18 mg/kg IV or phenobarbital 20 mg/kg IV if patient normally takes oral phenytoin
- What are the indications for CT head in status epilepticus?
  - First presentation
  - Not done previously (i.e. a previous admission)
  - Clinical features suggests new neurology
  - Precipitated by TBI