

APPROACH TO PATIENTS WITH SEIZURE

Seizure is a common presentation of acute neurological condition to ED.

Definitions

- **seizure** is an episode of abnormal neurologic function caused by inappropriate electrical discharge of brain neurons.
- **Epilepsy** is a clinical condition in which an individual is subject to recurrent seizures.
- **Primary or idiopathic seizures** are those in which no evident cause can be identified.
- **Secondary seizures** are a consequence of an identifiable neurologic condition, such as a mass lesion, previous head injury, or stroke.
- **Status epilepticus (SE)** is seizure activity ≥ 5 minutes, or two or more seizures without regaining consciousness between seizures.
- **Convulsive Status epilepticus (CSE)** is seizures with generalized rhythmic jerking of limbs and conscious level impairment which fulfil the criteria for status epilepticus.
- **Non-Convulsive Status epilepticus (NCSE)** is status epilepticus without a prominent (clinically obvious) motor component. NCSE can follow CSE. It is an important treatable cause of coma and should be treated as CSE.
- **Refractory status epilepticus (RSE)** is status epilepticus that does not respond to initial pharmacological therapy (one benzodiazepine and one non-benzodiazepine anticonvulsant medication).
- **Eclampsia** is the development of new-onset seizures, superimposed upon preeclampsia, in a woman between 20 weeks of gestation and 4 weeks postpartum.

Common Causes of Secondary Seizures

- Trauma (recent or remote)
- Intracranial hemorrhage (subdural, epidural, subarachnoid, intraparenchymal)
- Vascular lesion (aneurysm, arteriovenous malformation)
- Mass lesions (primary or metastatic neoplasms)
- Degenerative neurologic diseases
- Congenital brain abnormalities
- Infection (meningitis, encephalitis, abscess)
- Alcohol or drug withdrawal, acute intoxication
- Eclampsia of pregnancy (may occur up to 8 weeks postpartum)
- Hypertensive encephalopathy
- Anoxic-ischemic injury (cardiac arrest, severe hypoxemia)
- Hypo or hyperglycemia
- Hypo or hypernatremia
- Hypocalcemia, hypomagnesemia (rare)
- Hyperosmolar states
- Uremia
- Hepatic failure
- Cocaine, lidocaine, antidepressants, theophylline, isoniazid
- Mushroom toxicity (*Gyromitra* spp.)
- Hydrazine (rocket fuels)

TRIAGE

- Identify the patients with red criteria

INITIAL STABILIZATION

Position

Supine/ lateral position for patients with active seizure, keep the patient from physical injury

Airway

Assessment: airway patency +/-

Treatment: suction as needed, once attack subsides, secure airway by basic airway maneuver
+/- airway adjuncts

Breathing

Assessment: RR, SpO₂%, and auscultate the chest

Treatment: Give O₂, assisted ventilation if necessary

Circulation

Assessment: PR, BP, CRT

Treatment: IV access (take blood sample for blood tests)

Disability

- Pupil response
- GCS/ AVPU

Measure

- Temperature
- RBS (correct if hypoglycemia present)

Monitor: ECG, SpO₂%, BP, PR, RR, T°

Reassess: ABC...

DIRECTED HISTORY AND PHYSICAL EXAMINATION

History

- To determine whether the episode was truly a seizure, obtain a careful history of the details of the attack from the patient and any bystanders who witnessed the attack including the facts s/as;
 - the presence of a preceding aura
 - abrupt or gradual onset
 - progression of motor activity, whether the activity was localized, generalized, symmetric, or asymmetric
 - loss of bowel or bladder control
 - presence of oral injury
 - duration of attack
 - Determine the presence of postictal confusion or lethargy.
 - Ask about a history of recent or remote head injury
 - Other symptoms: h/o of persistent, severe, or sudden headache, vomiting, fever
- PMH: epilepsy, H/T, DM. If the patient is a known epileptic, identify precipitating factors;
 - missed doses of antiepileptic medications (common cause)
 - recent alterations in medication, including dosage change or conversion from brand name
 - sleep deprivation
 - increased strenuous activity
- Drug h/o: drug allergy, anticoagulants
- Social h/o: Alcohol, substance use or withdrawal, exposure to industrial or environmental toxins
- O&G h/o: present pregnancy(>20weeks), recent delivery

Physical examination

- General examination
Look for evidence of injuries as a result of the seizure, especially head or spine trauma, posterior shoulder dislocation, lacerations of the tongue and mouth, dental fracture
- Examine respiratory and cardiovascular systems
- Complete neurologic examination and subsequent serial examinations

Differential Diagnosis: syncope, dissociative seizures, movement disorder, migraine

Investigations

- ECG
- Blood tests: blood for CP, U&E, toxicology screen if poisoning/overdose is suspected, drug levels if available
- Imaging:
 - NECT (head): all 1st seizure in adults, if there is any concern for an acute intracranial pathology
 - X-rays: CXR, cervical spine, shoulder x-ray if necessary
- Consider additional investigations for patients with status epilepticus in the absence of seizure history

COMMENCE SPECIFIC TREATMENT

- Treatment of status epilepticus
 - Initial therapy of choice is Benzodiazepine
 - IV N/S line
 - IV Lorazepam (0.1mg/kg/dose, max:4mg/dose) or
 - IV Diazepam (0.15-0.2mg/kg/dose, max:10mg/dose)
 - If IV access is impossible,
 - PR Dz 0.5mg/kg or
 - IM or Buccal Midazolam (0.2-0.5mg/kg/dose, max:10mg)
 - If seizure continue, consider repeating the dose of benzodiazepine after 5-10 minutes
 - If seizure continue despite above therapy; single dose of
 - IV Phenytoin 20mg/kg, max:2g, at a rate of 50mg/min (in children rate not > 1mg/kg/min) or
 - IV Sodium valproate (40mg/kg, max:3g) or
 - IV Levetiracetam (60mg/kg, max:4.5g)
 - If none of options above are available, IV Phenobarbital 15mg/kg single dose
 - Consider intubation
- Treatment of refractory status epilepticus
 - Intubate patient
 - IVI Propofol 2-10mg/kg/hr titrated up to effect of seizure cessation (or)
 - IV Midazolam 0.1 - 0.2mg/kg bolus f/b 0.05 - 0.5mg/kg/hr titrated to effect
 - Consult with ICU
 - Continuous EEG monitoring if available
- Consider early intubation to protect the airway from aspiration if certain specific pathologies are suspected s/as trauma or drug overdose
- IV Thiamine 100mg if alcohol abuse or malnutrition is suspected, especially glucose has been given
- If the diagnosis is *eclampsia*, give Magnesium sulfate
- Treatment of any underlying cause s/as hypoglycemia, trauma, infection, hyponatremia, drugs/toxins/ poisons.

DISPOSITION

- Admit all patients who have had status epilepticus
- Admit the patients who required intubation and ventilation to ICU
- Instruct discharged patients to take precautions to minimize the risks of injury from further seizures

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