

F02: Seizures

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Introduction

A seizure is the result of abnormal and sudden electrical activity in the brain that can be caused by a wide range of conditions. Seizures can be a symptom of an underlying acute medical or neurological condition, or they can lack a clear etiology (as in the case of epilepsy). The main goals of seizure management are to stop the seizure, protect the patient from secondary injury such as aspiration or trauma, evaluate for and treat potentially reversible causes, and provide safe, expeditious conveyance to hospital.

Essentials

- Seizures can be traumatizing for bystanders and family. First-time seizures are particularly disturbing.
- Benzodiazepines are the first line therapy for active seizures.
- Consider important causes of seizures:
 - Hypoglycemia
 - Hypoxia
 - Traumatic head injury
 - Drug overdose, intoxication, or withdrawal
 - Exposure to toxic substances
 - Electrolyte disturbances
 - Cerebrovascular accidents
 - Infections and fevers, including infectious of the central nervous system
- Care more specifically for the patient than the patient's seizures
- For women who are, or who may be pregnant, consider the role of eclampsia
 - → [L03: Eclampsia](#)
- For children, see CPG M04 or M12
 - → [M04: Pediatrics: Neurological](#)
 - → [M12: Neonatal: Neurological](#)

Additional Treatment Information

- Protection of the airway and maintenance of effective oxygenation and ventilation is of critical importance. Profound hypoxia can develop in patients with prolonged seizure activity.
- As a general rule, paramedics should consider controlling seizures in patients who continue to seize after their arrival on-scene. Taking travel time into consideration, these patients are often seizing for upwards of ten minutes by the time an ambulance crew makes contact.
- Patients with known seizure disorders are often prescribed benzodiazepines to be administered by family or caregivers. Paramedics must be aware of this possibility and adjust their dosing strategies accordingly.
- Do not provide prophylactic benzodiazepines to patients who are not currently seizing.
- The duration of the postictal phase is often variable. Patients may exhibit a wide range of behaviors, none of which are intentional and none of which should prompt intervention from law enforcement. Wherever possible, paramedics and EMRs/FRs should provide patients with a quiet, non-stimulating space to recover from their seizure, while protecting them from further harm.

Referral Information

Patients with well-established seizure disorders who experience a single, self-limited seizure, may wish to decline conveyance to hospital.

Consultation with OniCall is required.

Interventions

First Responder

- Protect the patient from physical harm
- Provide supplemental oxygen as required
 - → [A07: Oxygen Administration](#)
- Attempt to place an oropharyngeal airway if required to maintain patency (do not force mouth open)
 - → [B01: Airway Management](#)
- Consider [Oral 40% Glucose Gel](#)

Emergency Medical Responder – All FR interventions, plus:

- Provide supplemental oxygen to maintain $SpO_2 \geq 94\%$
 - → [A07: Oxygen Administration](#)
- Consider use of nasopharyngeal airway
 - → [PR07: Nasopharyngeal Airway](#)
- Consider and search for reversible causes
- Obtain and document capillary blood glucose measurement.
 - Treat hypoglycemia if able without risk to airway management
 - → [E01: Hypoglycemia and Hyperglycemia](#)

Primary Care Paramedic – All FR and EMR interventions, plus:

- Treat hypoglycemia
 - → [E01: Hypoglycemia and Hyperglycemia](#)
- Consider supraglottic airway device in patients who are no longer seizing but remain profoundly obtunded and require airway management
 - → [PR08: Supraglottic Airways](#)
- If indicated as per [venipuncture ethical decision making](#), start IV [D03: Vascular Access and Fluid Administration](#)

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- When indicated, control seizures
 - [MIDAZOLam](#) intramuscularly; may repeat once if seizures continue and if IV access is unsuccessful
 - Obtain vascular access
 - → [D03: Vascular Access](#)
 - If seizures continue, [MIDAZOLam](#) intravenously; may repeat every 2-5 minutes as required
 - Modify doses for smaller/elderly individuals
 - [OniCall consultation recommended](#) to discuss additional dosing instructions.
- Consider intubation or advanced airway management for seizures refractory to treatment or continued profound unconsciousness
 - → [B01: Airway Management](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Attempt to arrest seizures with anticonvulsants; consider:
 - Benzodiazepines ([MIDAZOLam](#))
 - [Propofol](#)
 - [Ketamine](#)
 - [Call ETP prior to initiating antiepileptic](#)
 - [Levetiracetam](#)
 - [PhenyTOIN](#)

- [Phenobarbital](#)

- In unstable patients refractory to conventional treatments, consider the use of a neuromuscular blockade and intubation to maintain physiologic norms
 - [Call ETP prior to paralysis treatment.](#)
 - Consider evaluating serum electrolytes in searching for underlying (and potentially treatable) causes
- Secure airway if required
 - → [PR18: Anesthesia Induction](#)
 - → [PR29: Mechanical Ventilation](#)

Evidence Based Practice

Seizure (Adult)

Supportive

- [Diazepam-IV](#)
- [Lorazepam-IV](#)
- [Midazolam-IM](#)
- [Diazepam-IM](#)
- [Diazepam-PR](#)
- [Lorazepam-IM](#)
- [Midazolam-IV](#)
- [Status epilepticus scale](#)
- [Midazolam-IN](#)
- [Propofol](#)

Neutral

Against

