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# Status Epilepticus

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# Status epilepticus

a condition resulting either from the

- failure of the mechanisms responsible for seizure termination
- from the initiation of mechanisms,

which lead to abnormally prolonged seizures (after time point t1).

which can have long-term consequences (after time point t2),

neuronal death
neuronal injury depending on the type and duration of seizures
alteration of neuronal networks

# pathomechanisms

γ-aminobutyric acid–mediated (GABA-ergic) failure glutamatergic hyperactivity

Type of status epilepticus	Time t1	Time t2
	Seizure activity does not stop spontaneously with a high probability, therefore, time t1 is the time at which emergency treatment of status epilepticus should be started	Seizure activity may cause long-term sequelae, therefore, time t2 is the time at which treatment should be successful to prevent long-term consequences
Bilateral tonic-clonic status epilepticus	5 minutes	30 minutes
Focal status epilepticus with and without impairment of consciousness, absences	10 minutes	60 minutes

<sup>&</sup>lt;sup>a</sup> Modified with permission from Trinka E, et al, Epilepsia.<sup>1</sup> © 2015 International League Against Epilepsy.

### Fulfillment of status epilepticus time criteria t1

Stage 1

Early SE: Premonitory SE, impending SE

Stage 2

Established SE: After failure of first line

benzodiazepine: "benzodiazepine-refractory" SE

Stage 3

Refractory SE: Refractory to one benzodiazepine and at least one antiseizure medication

Stage 4

**Super-refractory SE:** SE that continues despite treatment with anesthetics >24 hours

Prolonged superrefractory SE: Superrefractory SE that persists for at least 7 days, including ongoing need for anesthetics

### **Prolonged refractory SE:**

Refractory SE that persists for at least 7 days despite appropriate management, but WITHOUT use of anesthetics

Stabilize patient and prepare adequate dose of benzodiazepines (IV or alternative routes)

<u>DEFINITION:</u> 5 minutes for SE with prominent motor phenomena, 10 minutes for all others

First line: IV (IN, IM, or buccal) benzodiazepines

USUALLY within 5-10 minutes (total SE duration)

Second line: IV antiseizure medication

USUALLY within 10-30 minutes (total SE duration)

Third line: IV anesthetics

USUALLY within 30-60 minutes (total SE duration)

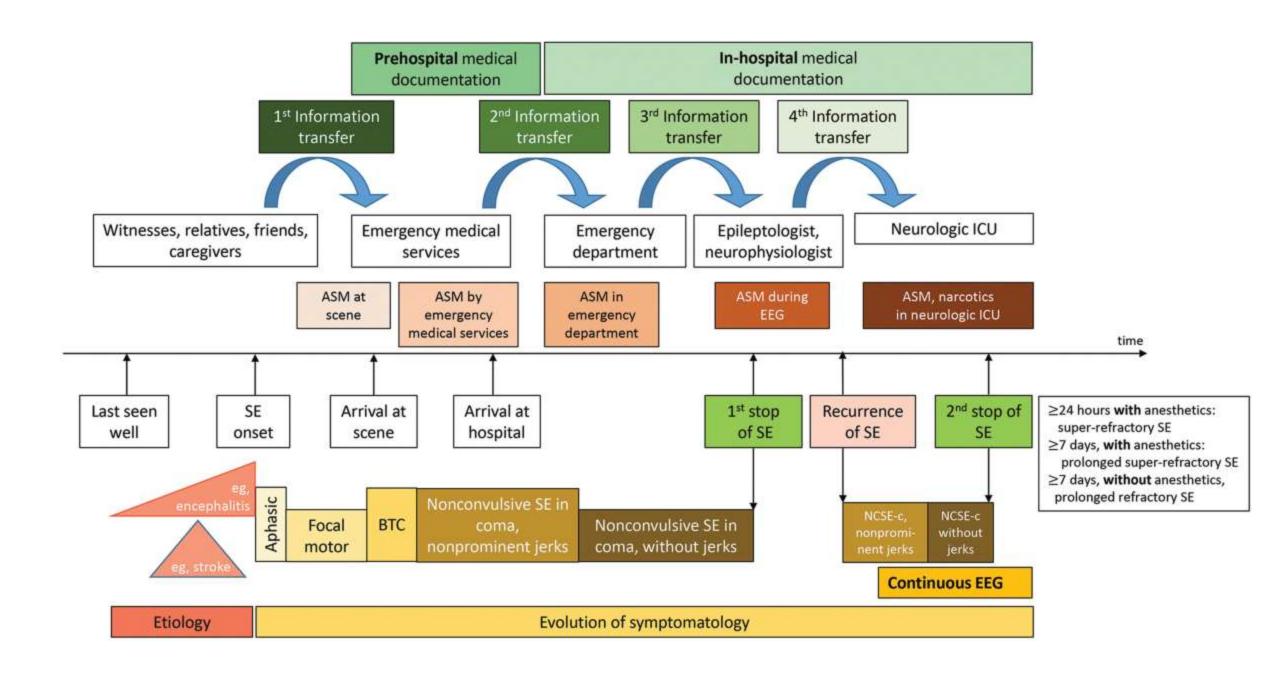
**DEFINITION: 24 hours** 

ACTIVITY

SEIZURE

DNIODNO

**DEFINITION:** 7 days



### Classification of SE

SE with prominent motor phenomena

SE without prominent motor phenomena, nonconvulsive SE

Tonic-clonic SE, convulsive SE Myoclonic Focal motor Hyperkinetic Tonic Oculo-Generalized Focal onset Unknown With With-Repeated Epilepsia Adversive Ictal whether focal motor partialis clonic convulsive evolving to out status paresis, coma (Jacksonian) focal bilateral focal or continua coma convulsive SE inhibitory generalized

SE without prominent motor phenomena, nonconvulsive SE

Nonconvulsive SE with coma, subtle SE

### Nonconvulsive SE without coma Generalized Unknown whether Focal focal or generalized Myoclonic Without impairment of consciousness Aphasic With impaired Typical Atypical absence absence absence consciousness Autonomic Aura continua, with autonomic, sensory, status status status visual, olfactory, gustatory, emotional/ psychic/experiential, or auditory symptoms

### **Time Line**

### 0-5 Minutes Stabilization Phase

# Interventions for emergency department, in-patient setting, or prehospital setting with trained paramedics

- 1. Stabilize patient (airway, breathing, circulation, disability neurologic exam)
- 2. Time seizure from its onset, monitor vital signs
- Assess oxygenation, give oxygen via nasal cannula/mask, consider intubation if respiratory assistance needed
- Initiate ECG monitoring
- Collect finger stick blood glucose. If glucose < 60 mg/dl then Adults: 100 mg thiamine IV then 50 ml D50W IV Children ≥ 2 years: 2 ml/kg D25W IV Children < 2 years: 4 ml/kg D12.5W IV</li>
- Attempt IV access and collect electrolytes, hematology, toxicology screen, (if appropriate) anticonvulsant drug levels



## 5-20 Minutes Initial Therapy Phase

Berat badan 50 kg (0,2 mgx50 kg=10 mg)

1 ampul diazepam (10 mg) Dalam 10 cc NS Bolus pelan 5 mg/menit



### A benzodiazepine is the initial therapy of choice (Level A):

Choose one of the following 3 equivalent first line options with dosing and frequency:

- Intramuscular midazolam (10 mg for > 40 kg, 5 mg for 13-40 kg, single dose, Level A) OR
- Intravenous lorazepam (0.1 mg/kg/dose, max: 4 mg/dose, may repeat dose once, Level A) OR
- Intravenous diazepam (0.15-0.2 mg/kg/dose, max: 10 mg/dose, may repeat dose once, Level A)

If none of the 3 options above are available, choose one of the following:

- Intravenous phenobarbital (15 mg/kg/dose, single dose, Level A) OR
- · Rectal diazepam (0.2-0.5 mg/kg, max: 20 mg/dose, single dose, Level B) OR
- Intranasal midazolam (Level B), buccal midazolam (Level B)

If patient at baseline, then symptomatic medical care

YES Does Seizure Continue?

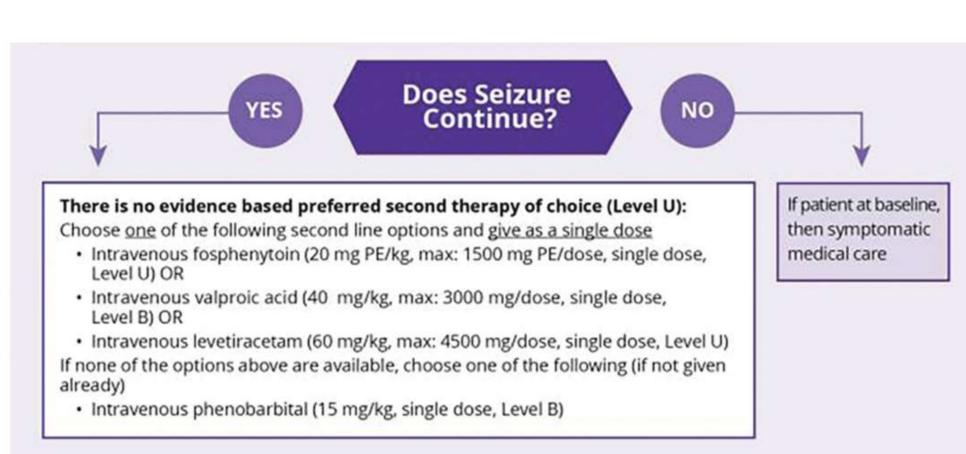
NO

### 20-40 Minutes Second Therapy Phase

Fenitoin 15-18 mg/kg/ Berat badan 50 kg (15 mgx50 kg=750 mg) (18 mgx50 kg=900 mg)

1 ampul fenitoin (100 mg)
Dalam 10 cc NS
Bolus pelan 50 mg/menit

8-9 ampul



Does Seizure Continue?

NO







Disclaimer: This clinical algorithm/guideline is designed to assist clinicians by providing an analytic framework for evaluating and treating patients with status epilepticus. It is not intended to establish a community standard of care, replace a clinician's medical judgment, or establish a protocol for all patients. The clinical conditions contemplated by this algorithm/guideline will not fit or work with all patients. Approaches not covered in this algorithm/guideline may be appropriate.

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