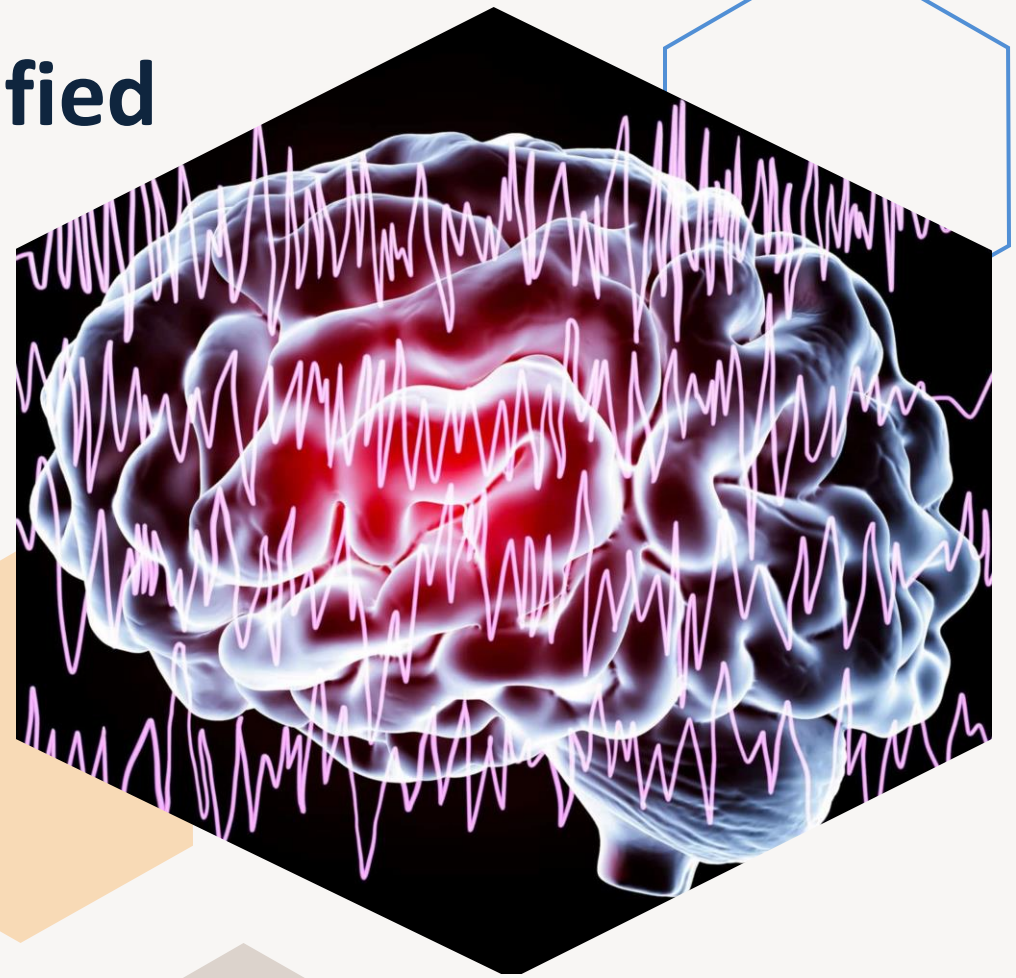
SEIZE CONTROL

Antiseizure Medications Demystified



2025 Akron Children's APRN/PA Pharmacology Conference
September 17, 2025

Francesca Shick, MSPAS, PA-C
Neurodevelopmental Science Center

Akron Children's

Disclosures: None

Objectives

Describe the pharmacological treatment options for pediatric seizures

Assess and manage potential side effects and drug interactions of antiseizure medications (ASM)

Discuss non-pharmacological options for management of pediatric epilepsy

Definitions[1]

Seizure

ILAE (International League Against Epilepsy) definition:[1]
“a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain"

Generalized Seizure
- Generalized Tonic Clonic (GTC)
- Myoclonic
- Tonic
- Atonic
- Absence
- Etc.

Focal Seizure
- Focal preserved conciousness seizure (FPC)
- Focal impaired conciousness seizure (FIC)
- Focal-to-bilateral tonic-clonic seizure (FBTC)

Unknown whether focal or generalized

Unclassified

Epilepsy

ILAE definition:
"a disorder of the brain characterized by an enduring predisposition to generate epileptic seizures and by the neurobiologic, cognitive, psychological, a nd social consequences of this condition. The definition of epilepsy requires the occurrence of at least one epileptic seizure.“1

Clinical definition:
(1) at least two unprovoked (or reflex) seizures occurring more than 24 hours apart
(2) one unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years, or
(3) diagnosis of an epilepsy syndrome

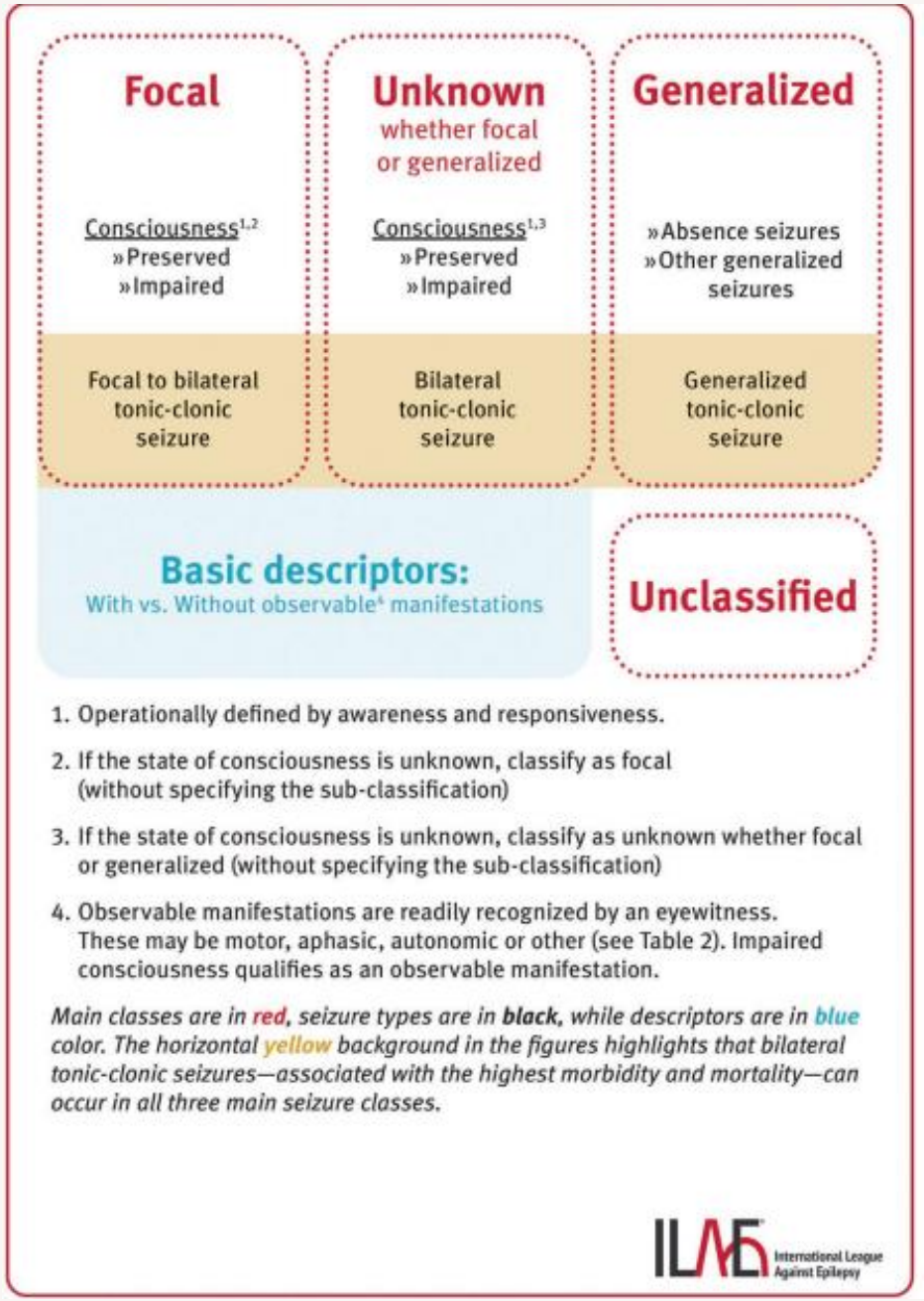


Image: Beniczky S, Trinka E, Wirrell E, et al. Updated classification of epileptic seizures: Position paper of the International League Against Epilepsy. Epilepsia. 2025;66(6):1804-1823. doi:10.1111/epi.18338

Who needs treatment?

Maintenance/Daily ASM

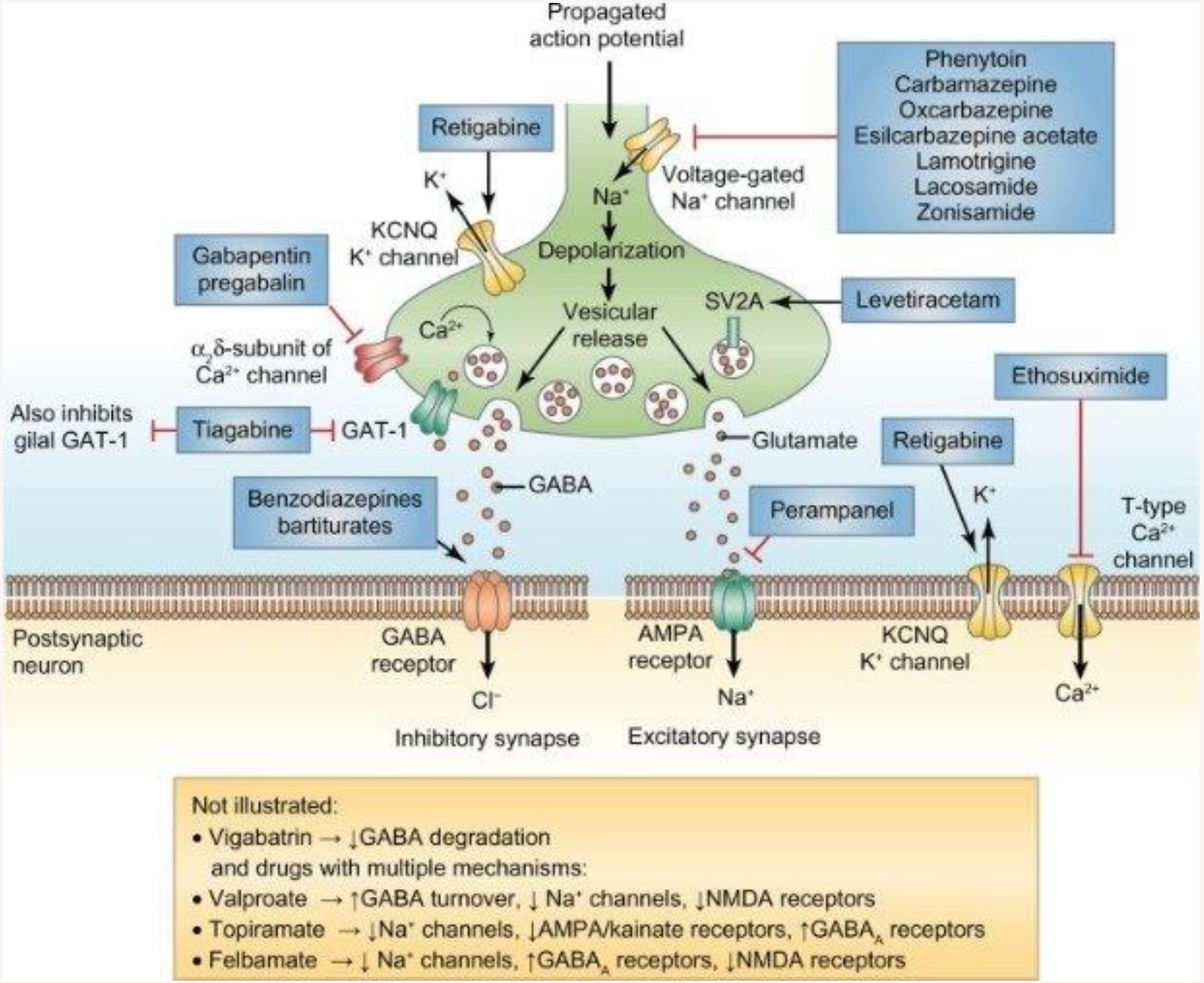
- Epilepsy Diagnosis
- Recurrent/prolonged febrile seizures
- Provoked seizures in acute setting
- Seizure "prophylaxis"

Seizure Rescue medications

- Home Rescue: Any child > 2 years of age that has had an event clinically concerning for a seizure
- Healthcare Setting: any patient having event clinically concerning for seizure last > 5 minutes OR recurrent seizures

Choosing Treatment[2]

Epilepsy Characteristics	Patient Characteristics	ASM Characteristics	Side effects	Other
• Seizure type • Epilepsy syndrome • Seizure frequency	• Age • Sex/pregnancy • Comorbidities • Medications/Allergies • Ethnicity/genomics	• Indications • Efficacy • Forms – IV, tablet, liquid • Titration	• SE profile • Drug interactions • Half-life • Teratogenic risk	• $$$/insurance • Availability • Personal choice

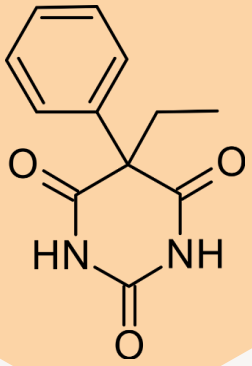


Image[3]: Shih JJ, Tatum WO, Rudzinski LA. New drug classes for the treatment of partial onset epilepsy: focus on perampanel. *Ther Clin Risk Manag.* 2013;9:285-293. doi:10.2147/TCRM.S37317

Generic	Brand	MOA
Brivaracetam	Briviact	Binds SV2A
Carbamazepine	Tegretol	Block Na channels
Cannabidiol	**Epidiolex**	Enhance GABA, modulate Ca
Cenobamate	Xcopri	Block Na channels
Clobazam	**Onfi**	Enhance GABA
Eslicarbazepine acetate	Aptiom	Block Na channels
Ethosuximide	Zarontin	Block t-type Ca channels
Felbamate	Felbatol	Various mechanisms
Fenfluramine	Fintepla	Enhance serotonin
Gabapentin	----------	Binds Ca channel subunit
Ganoxolone	Ztalmy	Enhance GABA
Lacosamide	**Vimpat**	Block Na channels
Lamotrigine	**Lamictal**	Block Na channels
Levetiracetam	**Keppra**	Binds SV2A

Generic	Brand	MOA
Oxcarbazepine	**Trileptal**	Block Na channels
Perampanel	Fycompa	AMPA antagonist
Phenobarbital	----------	Enhance GABA
Phenytoin	**Dilantin**	Block Na channels
Pregabalin	Lyrica	Binds Ca channel subunit
Primidone	----------	Enhance GABA
Rufinamide	Banzel	Block Na channels
Stiripentol	Diacomit	Enhance GABA
Tigabaine	Gabatril	Enhance GABA
Topiramate	**Topamax**	Block Na channel, APMA antagonism, enhance GABA
Valproate	**Depakote**	Block Na channel, enhance GABA, block t-type Ca channels
Vigabatrin	Sabril	Enhance GABA
Zonisamide	Zonegran	Block Na channel, block t-type Ca channels

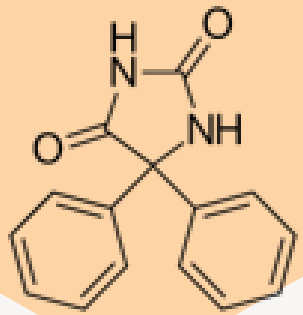
Phenobarbital



- **Indications**
  - All seizure types
  - Neonatal seizures
  - Status epilepticus
- **Mechanism of Action**
  - Binds $GABA_A$ receptor → prolongs opening of chloride channel → enhances GABA inhibition
- **Metabolism/Interactions**
  - Liver metabolized
  - CYP450 enzyme inducer = MANY interactions
- **Dose**
  - Pediatric: 4 - 6 mg/kg/day (divided BID)
  - Adult: 1.5 – 4 mg/kg/day
- **Side Effects**
  - Sedation, hyperactivity (children), ataxia, dysarthria
  - Cognitive impairment
  - Decreased bone mineral density (BMD)
- **Monitoring**
  - Levels: 10-40 mg/L
  - Vitamin D, liver enzymes, other AED levels

Remember… IV, neonates, interactions, sedating

Phenytoin
(Fosphenytoin)
Dilantin

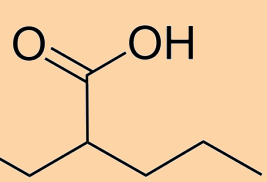


- **Indications**
  - Most seizure types (not absence or myoclonic)
  - Status epilepticus (IV)
- **MOA**
  - Binds to sodium channels → reduces high frequency firing
- **Metabolism/Interactions**
  - Potent enzyme inducer (CYP450) – many interactions
  - Non-linear pharmacokinetics
- **Dose**
  - Pediatric: 5 – 8 mg/kg/day (can go up to 10 mkd, use levels)
  - Status: IV loading dose of 20 mg/kg
  - Adult: 200 – 400 mg/day
- **Side Effects**
  - Ataxia, nystagmus, slurred speech, discoordination
  - Toxic hepatitis, gingival hyperplasia, decreased BMD
  - Rare/severe: SJS, hematologic (pancytopenia, aplastic anemia etc.)
- **Monitoring**
  - Levels (10-20 mg/L)
  - CMP, folate, vitamin D (q 6-12 months)

Remember… status epilepticus, levels, cerebellar SE

Valproate

Depakote*

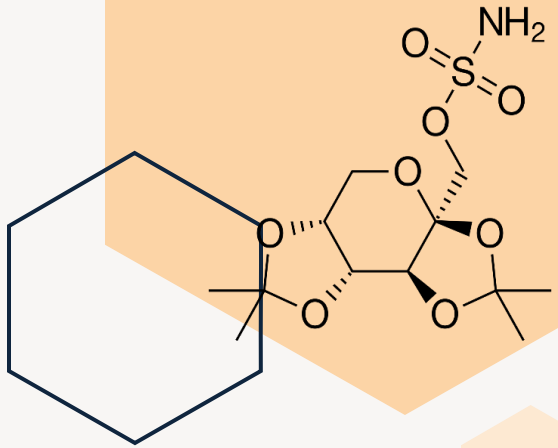


- **Indications**
  - Multiple seizure types including absence seizures
  - Status epilepticus
  - Other: bipolar disorder, migraine prophylaxis
- **MOA** (variety)
  - Increases GABA
  - Blocks voltage gated sodium channels
  - Activate Ca-dependent potassium conductance
- **Metabolism/Interactions**
  - MANY interactions – especially Lamictal
- **Dose**
  - Pediatric: 10 – 15 mg/kg/day → 20 – 40 mg/kg/day
  - Caps (BID), tabs (BID), sprinkles (BID), liquid (TID), IV (QID)
  - Adult: 500 – 2500 mg/day
- **Side Effects**
  - Tremor, drowsiness, dizziness
  - Weight gain, alopecia, hirsutism/PCOS
  - Teratogenic (neural tube defects)
  - GI upset, pancreatitis
  - Hepatotoxicity*, hyperammonemia, bone marrow suppression
  - Mood stabilization (beneficial "side effect")
- **Monitoring**
  - CBC, LFTs – 1-2 months after initiation → q6 months
  - Vitamin D, ammonia (especially if AMS)
  - Levels (50 -100 mg/kg/day)

Remember… broad, no babies, limit females, labs

Topiramate

Topamax

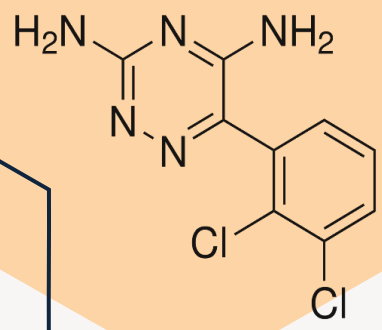


- **Indications**
  - ALL seizure types
  - Other: migraine prophylaxis, PTSD, bipolar disorder, IIH, binge eating disorder, neuropathic pain etc.
- **MOA**
  - Enhances GABA
  - Inhibits voltage-dependent sodium channels
  - Decrease glutamate excitation (AMPA antagonism)
  - Carbonic anhydrase inhibition
- **Metabolism/Interactions**
  - May interact with AEDs, cardiac meds, amitriptyline, sumatriptan etc.
  - Do not use in conjunction with other carbonic anhydrase inhibitors
  - OCPs
- **Dose**
  - Pediatric: 1 mg/kg/day → 3-8 mg/kg/day
  - Adult: 100 – 600 mg/day
- **Side Effects**
  - Cognitive slowing, anorexia/weight loss, sedation, blurry vision, impaired memory, paresthesia
  - Oligohydrosis, metabolic acidosis, nephrolithiasis
- **Monitoring**
  - Periodic BMP – sodium bicarb levels
  - Levels: 5 – 20 mg/L

Remember… broad spectrum, cognition, hydration

Lamotrigine

Lamictal

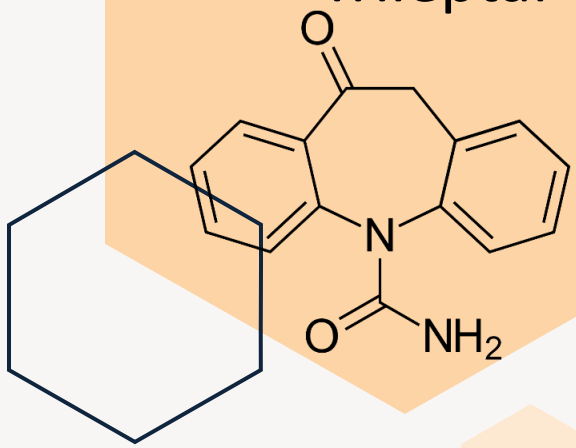


- **Indications**
  - Most seizure types
  - *May* worsen myoclonic seizures
  - Other: Bipolar disorder, migraine, neuropathy, cluster headaches etc
- **MOA**
  - Modulates sodium channels
  - Inhibits glutamine release
- **Metabolism/Interactions**
  - Various AEDs (especially valproate)
  - OCPs
  - Lamotrigine + Topiramate and Lamotrigine + vigabatrin may be synergistic
- **Dose**
  - Goal pediatric dose = 2-8 mg/kg/day
  - SLOW titration – 0.4 mkd x 2 weeks → 0.8 mkd x 2 weeks → increase by 0.8 q 2 weeks
  - Goal adult dose: 100 – 200 mg/day (500 mg/day max)
- **Side Effects**
  - Rash – drug eruption versus SJS
  - Dizziness, headache, GI upset, tremor
  - Mood stabilization (benefit)
- **Monitoring**
  - Yearly liver function and CBC
  - Levels: 3-15 mg/L

Remember… mood stabilizer, SJS, slow titration

Oxcarbazepine

Trileptal

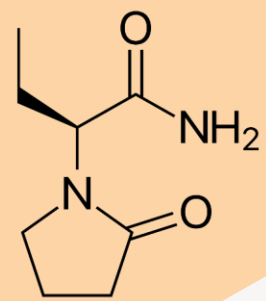


- **Indications**
  - Focal seizures ONLY
  - Other: bipolar disorder, trigeminal neuralgia
- **MOA**
  - Blocks sodium channels
- **Metabolism/Interactions**
  - Carbamazepine, lacosamide, perampanel, phenobarbital, phenytoin
  - OCPs
- **Dose**
  - Pediatric: 10 mg/kg/day → 20 – 40 mg/kg/day (max 1800 mg/day)
  - Adult: 600 – 2400 mg/day
- **Side Effects**
  - Fatigue, dizziness, headache, vertigo
  - Nausea, vomiting
  - Rash – eruption versus SJS
  - Hyponatremia
  - Rare hematologic dyscrasias
- **Monitoring**
  - CBC and BMP before and after starting then ~ q12 months
  - Vitamin D
  - Levels: 3-35 mg/L

Remember… focal seizures, hyponatremia, rash

Levetiracetam

Keppra

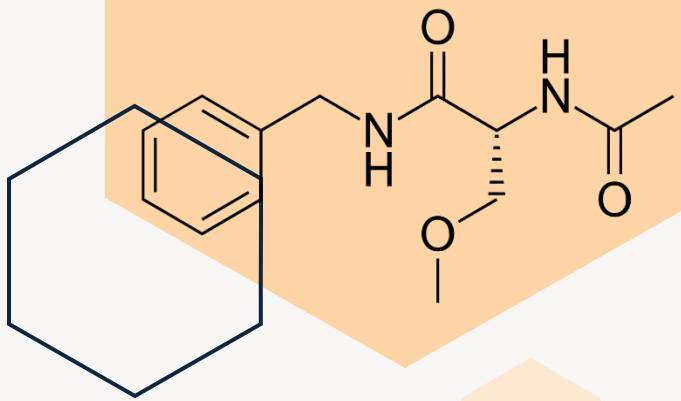


- **Indications**
  - ALL seizures types
  - ALL forms
  - Status epilepticus
- **MOA**
  - SV2A binding → disrupts synaptic vesicle exocytosis
- **Metabolism/Interactions**
  - Minimal interactions
  - Renal excretion – may need to renally dose if renal impairment
- **Dose**
  - Pediatric: 10 – 20 mg/kg/day → 60 – 80 mg/kg/day
  - Adult: 1000 – 3000 mg/day (up to 4,000)
- **Side Effects**
  - Fatigue and behavioral changes
- **Monitoring**
  - None ☺

Remember… when in doubt start with Keppra, behavior

Lacosamide

Vimpat

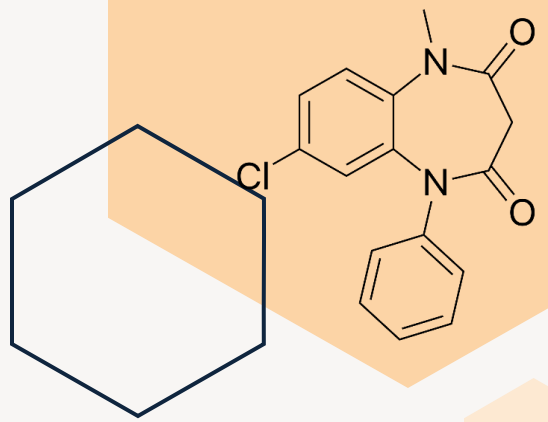


- **Indications**
  - Focal seizures
  - Status epilepticus (IV)
- **MOA**
  - Enhances inactivation of sodium channels → stabilizes neuronal membranes
- **Metabolism/Interactions**
  - Avoid co-medicating with other similar sodium channel medications
- **Dose**
  - Pediatric: 4 mg/kg/day → 6-8 mg/kg/day (max 12)
  - Adult: 200 – 400 mg/day
- **Side Effects**
  - Dizziness, blurred vision, coordination issues, tremor
  - GI upset
  - PR prolongation
- **Monitoring**
  - EKG BEFORE starting due to risk of PR prolongation
  - Levels: 10-20 mg/L
  - CMP q 12 months

Remember… focal, IV, EKG first

Clobazam

Onfi

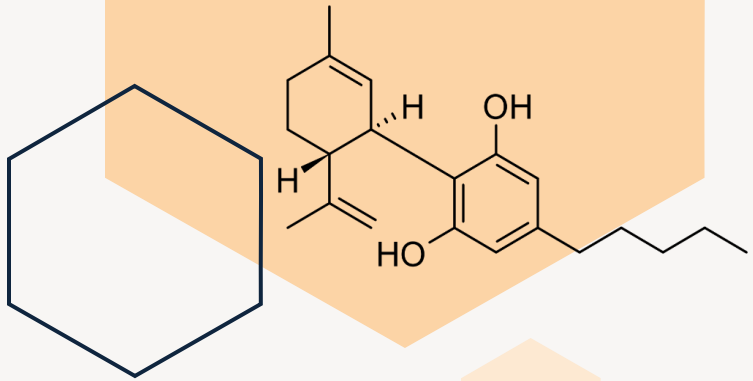


- **Indications**
  - Adjunctive treatment for focal and generalized seizures
  - Catamenial epilepsy and Lennox-Gastaut syndrome
- **MOA**
  - Enhances GABA
  - Benzodiazepine
- **Metabolism/Interactions**
  - Longer half life (36-46 hours in kids)
  - Can potentiate effects of other CNS depressants
  - Phenytoin, primidone, stiripentol, cannabidiol, valproate* etc.
- **Dose**
  - Pediatric: 0.25 mg/kg/day → 1-2 mg/kg/day
  - Adult: 20 – 40 mg/day
- **Side Effects**
  - Sedation/drowsiness, dizziness, rash, increase in secretions
  - Mood changes – hyperactivity, insomnia, depression
  - Respiratory depression and tolerance at higher doses
- **Monitoring**
  - Levels: 30-300 (ng/mL)
  - CMP intermittently

Remember… sedation, 2nd/3rd line

Cannabidiol

Epidiolex

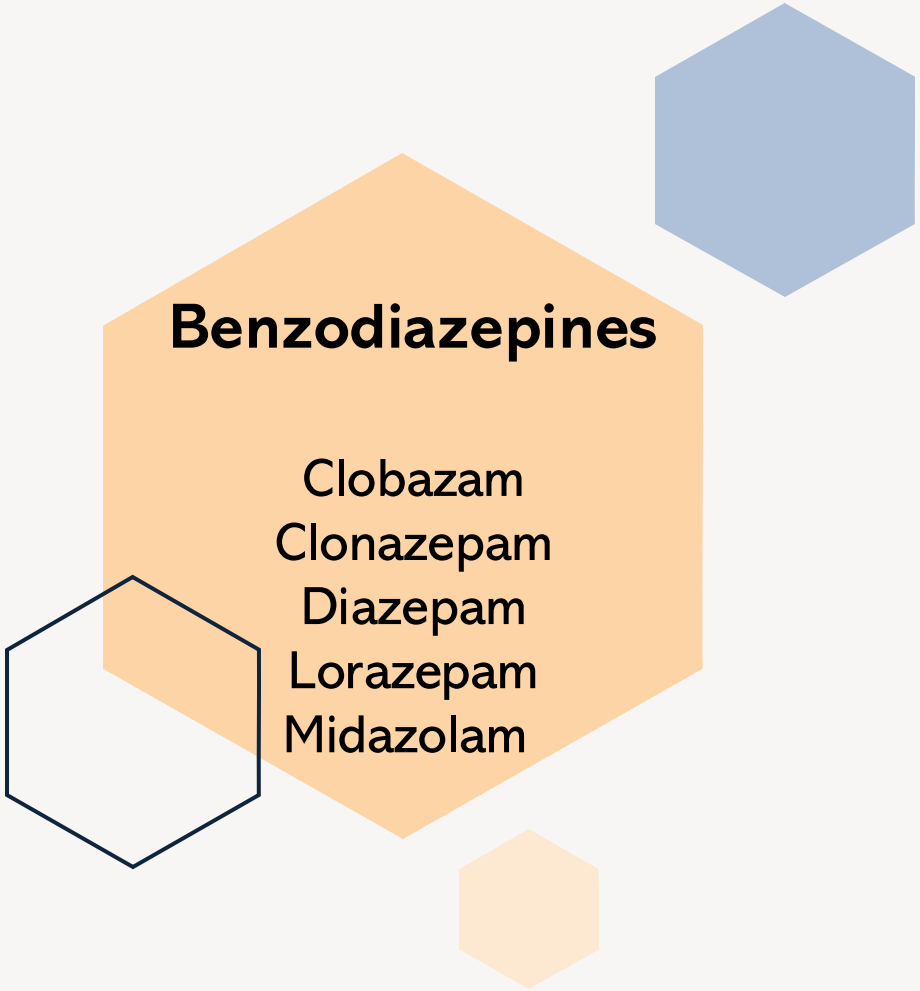


- **Indications**
  - Lennox-Gastaut Syndrome
  - Dravet Syndrome
  - Tuberous Sclerosis
- **MOA***
  - Enhance GABA
  - Modulate intracellular calcium
- **Metabolism/Interactions**
  - Reduces clearance (increases levels) of Onfi
- **Dose**
  - Pediatric: 5 mg/kg/day → 20 mg/kg/day
  - Adult: 3 – 10 mg/kg/day
- **Side Effects**
  - GI upset, sedation
  - Elevated liver enzymes
- **Monitoring**
  - Liver enzymes
  - Other AED levels

Remember… Refractory epilepsy, interactions, liver

Status Epilepticus[5]

- ILAE defines status epilepticus (SE) as “a condition resulting either from the failure of the mechanisms responsible for seizure termination or from the initiation of mechanisms which lead to abnormally prolonged seizures (after time point t1). It is a condition that can have long-term consequences (after time point t2), including neuronal death, neuronal injury, and alteration of neuronal networks, depending on the type and duration of seizures.”
- Initiate treatment at t1 (5 minutes)
- Concern for brain damage begins at t2 (30 minutes)



- **Indications**
  - Status epilepticus
  - MANY MORE
- **MOA**
  - Binds $GABA_A$ receptor -> enhance inhibitory action of GABA
- **Metabolism/Interactions**
  - Depressive effects worsened when taken with other CNS depression
- **Dose** varies between drugs and formulation
- **Side Effects**
  - Sedation, lethargy, ataxia
  - Respiratory depression
  - Tolerance and withdrawal

Inpatient Benzodiazepines[6]

Lorazepam (Ativan)

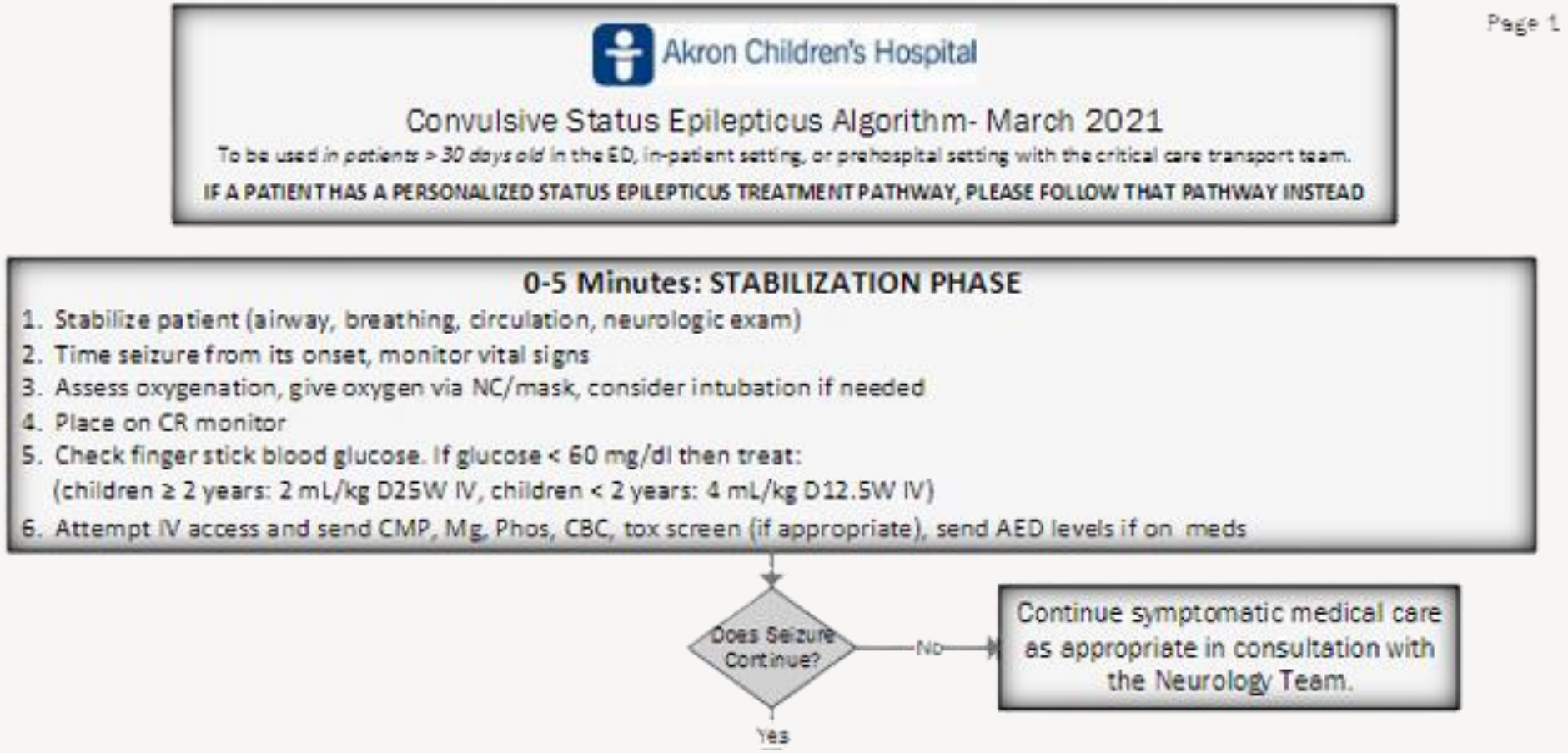
- IM, IV, PO
- 0.1 mg/kg (max 2-4 mg)
- Can repeat dose once after 5-10 minutes

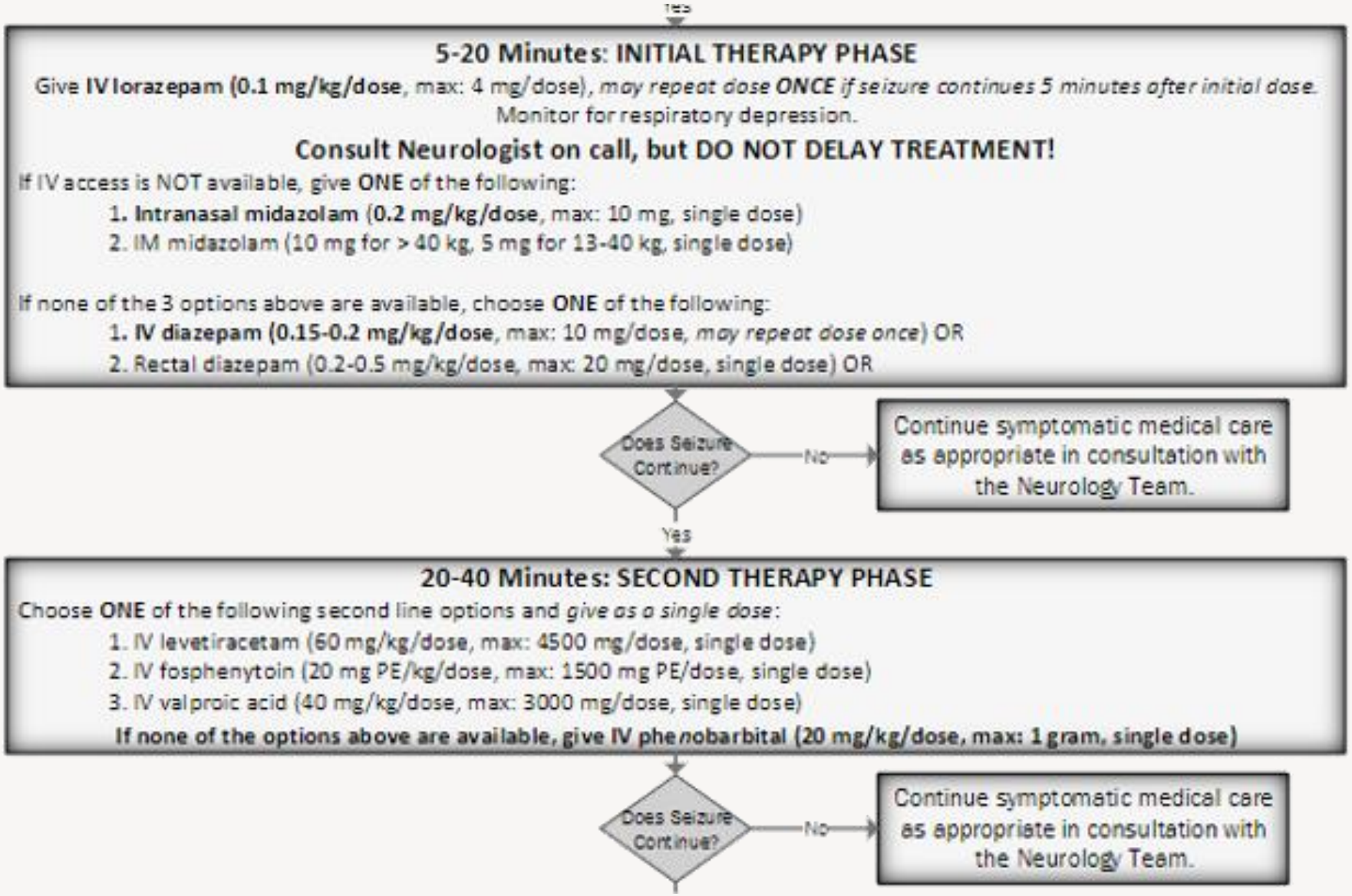
Midazolam (Versed)

- IM, IV, PO, Intranasal
- Continuous infusion
- IN/IV = 0.2 mg/kg (max 10 mg)
- Gtts = bolus above dose -> start infusion at 0.1 mg/kg/hr -> escalate with 0.2 bolus and increase by 0.1 (max 2 mg/kg/hr)

Management of Status Epilepticus[6,7]

KIDSNET "Convulsive Status Epilepticus Algorithm"




Yes
5-20 Minutes: INITIAL THERAPY PHASE
Give IV lorazepam (0.1 mg/kg/dose, max: 4 mg/dose), may repeat dose ONCE if seizure continues 5 minutes after initial dose.
Monitor for respiratory depression.
Consult Neurologist on call, but DO NOT DELAY TREATMENT!
If IV access is NOT available, give ONE of the following:
1. Intranasal midazolam (0.2 mg/kg/dose, max: 10 mg, single dose)
2. IM midazolam (10 mg for > 40 kg, 5 mg for 13-40 kg, single dose)
If none of the 3 options above are available, choose ONE of the following:
1. IV diazepam (0.15-0.2 mg/kg/dose, max: 10 mg/dose, may repeat dose once) OR
2. Rectal diazepam (0.2-0.5 mg/kg/dose, max: 20 mg/dose, single dose) OR
Does Seizure Continue?
No
Continue symptomatic medical care as appropriate in consultation with the Neurology Team.
Yes
20-40 Minutes: SECOND THERAPY PHASE
Choose ONE of the following second line options and give as a single dose:
1. IV levetiracetam (60 mg/kg/dose, max: 4500 mg/dose, single dose)
2. IV fosphenytoin (20 mg PE/kg/dose, max: 1500 mg PE/dose, single dose)
3. IV valproic acid (40 mg/kg/dose, max: 3000 mg/dose, single dose)
If none of the options above are available, give IV phenobarbital (20 mg/kg/dose, max: 1 gram, single dose)
Does Seizure Continue?
No
Continue symptomatic medical care as appropriate in consultation with the Neurology Team.

40-60 Minutes: THIRD THERAPY PHASE

If Status Epilepticus (SE) persists, recommend transfer to the PICU. Consider endotracheal intubation. Give an additional **SECOND THERAPY** medication and at the same time order a midazolam infusion.
If the midazolam infusion is available first, OK to skip repeat dose of second line therapy.

Give midazolam bolus (0.2 mg/kg/dose, max: 10 mg/dose) and start infusion at 0.1 mg/kg/hr (max: none). If SE persists after 15 mins, repeat bolus (0.2 mg/kg/dose, max: 10 mg/dose) and increase infusion by 0.1 mg/kg/hr. Repeat bolus and escalation of drip to a max of 2 mg/kg/hr every 15 min if SE persists.

ADDITIONAL WORK-UP

- Suggest low threshold to obtain head CT especially in focal SE, with any focal deficit, with known bleeding disorder, or when concerned about trauma/NAT.
- Consider sending urine drug screen and/or coma panel.
- If there is concern for bacterial or viral infection, perform lumbar puncture once the patient is stable. Do NOT delay antibiotic or antiviral treatment.
- Determine if additional testing is indicated with neurology team.

WHEN TO WEAN

The goal is 24 hours without seizure activity. Once this is achieved, discuss with the neurology and epilepsy teams to determine weaning strategy.

Home Benzodiazepines

Diastat® (Rectal Diazepam)

DIASTAT® AcuDial™ (diazepam rectal gel) Dosing Recommendations (by age and weight)					
2 to 5 years 0.5 mg/kg		6 to 11 years 0.3 mg/kg		12+ years 0.2 mg/kg	
Weight (kg)	Dose (mg)	Weight (kg)	Dose (mg)	Weight (kg)	Dose (mg)
6 to 10	5	10 to 16	5	14 to 25	5
11 to 15	7.5	17 to 25	7.5	26 to 37	7.5
16 to 20	10	26 to 33	10	38 to 50	10
21 to 25	12.5	34 to 41	12.5	51 to 62	12.5
26 to 30	15	42 to 50	15	63 to 75	15
31 to 35	17.5	51 to 58	17.5	76 to 87	17.5
36 to 44	20	59 to 74	20	88 to 111	20

Image: Diastat.com

Home Benzodiazepines

Valtoco® (Diazepam nasal spray)

	5 mg	10 mg	15 mg	20 mg
2-5 years (0.5 mg/kg)	**6-11 kg** (13-24 lb)	**12-22 kg** (25-49 lb)	**23-33 kg** (50-73 lb)	
6-11 years (0.3 mg/kg)	**10-18 kg** (22-40 lb)	**19-37 kg** (41-81 lb)	**38-55 kg** (82-121 lb)	**56-74 kg** (122-163 lb)

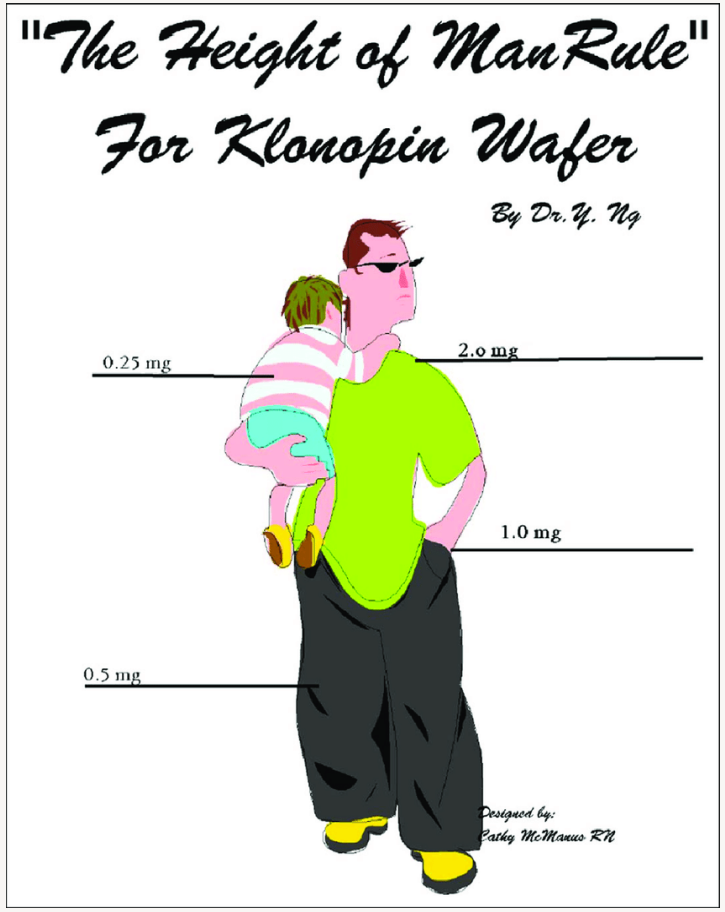
	5 mg	10 mg	15 mg	20 mg
12+ years (0.2 mg/kg)	**14-27 kg** (30-60 lb)	**28-50 kg** (61-111 lb)	**51-75 kg** (112-166 lb)	**76 kg and up** (167 lb and up)
			Majority of adult doses are 15 mg and 20 mg	

Image: Valtoco.com

Home Benzodiazepines

Klonopin

(Clonazepam ODT)



Nayzilam®

(Midazolam nasal spray)

- One dose = 5 mg
- Can repeat 5 mg dose after 5 minutes

Non-Pharmacologic Treatments for Epilepsy[8]

Metabolic

Ketogenic Diet

Neuromodulation

Vagal Nerve Stimulator (VNS)

Responsive Neurostimulation (RNS)

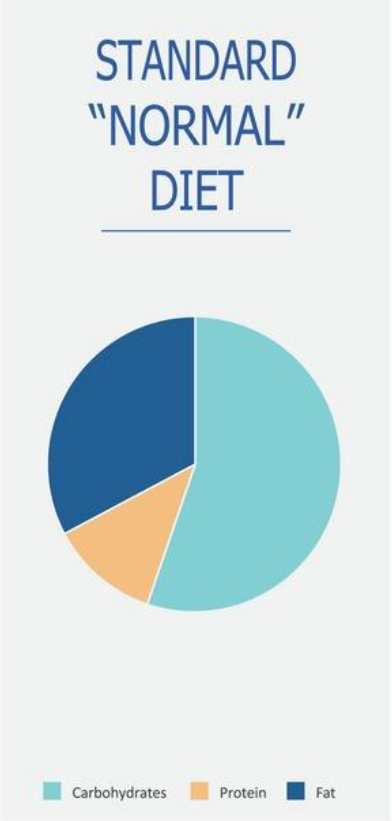
Surgical Options

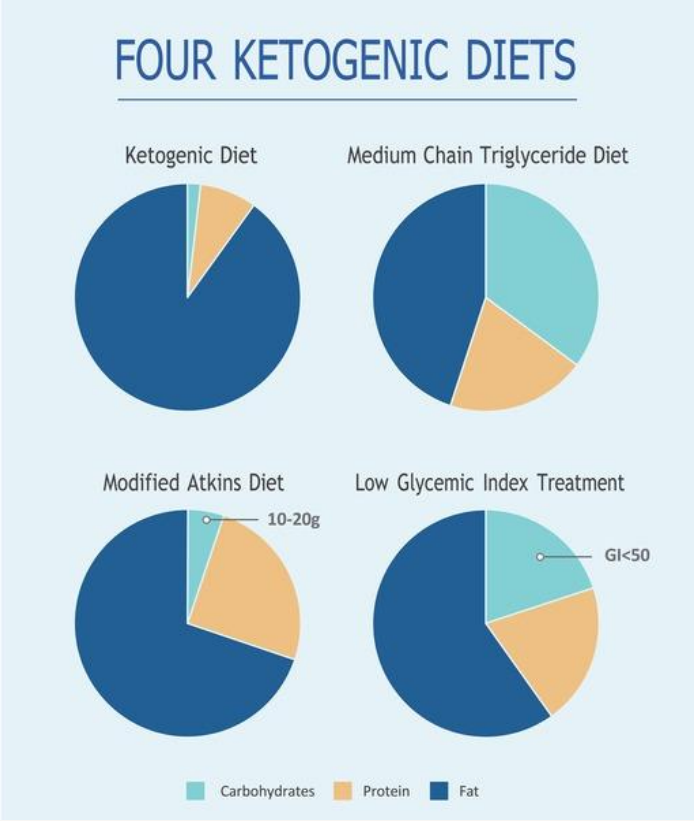
Resective

Disconnective

Ketogenic Diet[9]

- Indications
  - Specific metabolic diseases - Glucose Transporter Protein 1 (GLUT-1) deficiency syndrome and Pyruvate Dehydrogenase Deficiency
  - Refractory/Intractable epilepsy
    - Dravet syndrome, Doose syndrome, FIRES, TSC
    - *Formula/GT patients





- **High fat,** low protein, very low carb
- Proposed MOA – Mimic fasting state, fats used as primary fuel source creating ketone bodies which have an anticonvulsant effect*
- Side effects: dehydration, hypoglycemia, lethargy, metabolic acidosis, and gastrointestinal symptoms (constipation)
- Requires very close monitoring - blood monitoring before and during treatment, adequate nutritional intake etc.

Epilepsy Surgery[8]

- Overall Goals
  - Seizure reduction
  - Seizure freedom
  - Improve QOL and development
  - Palliation
- Patient Selection
  - Refractory epilepsy
  - Lesional epilepsy – focus clearly identified
  - No other CI
- Significant multidisciplinary discussion and testing process
  - Epilepsy
  - Neurosurgery
  - Neuropsychology
  - Social work

Table 5: Selection criteria for childhood epilepsy surgery

Resective surgery
Seizures arise from a distinct area of the brain
The epileptogenic area is functionally silent
Drug-resistant epilepsy
Hemispherotomy
One-hemispherical structural abnormality
Seizures lateralized to the abnormal hemisphere
Pre-existing neurological deficit due to the underlying cause
Drug-resistant epilepsy
Hypothalamic hamartoma
Children with drug-resistant epilepsy
Progressive cognitive, developmental decline
Corpus callosotomy
Children with disabling drop attacks
Drug-resistant epilepsy
Severe mental retardation
Vagal nerve stimulation
Children with drug-resistant epilepsy who are not candidates for resective epilepsy surgery

Image: Jayalakshmi S, Panigrahi M, Nanda SK, Vadapalli R. Surgery for childhood epilepsy. *Ann Indian Acad Neurol.* 2014;17(Suppl 1):S69-S79. doi:10.4103/0972-2327.128665

Surgical Techniques[8,10]

- Resection of epileptogenic region/foci
  - Anterior temporal lobectomy
  - Lesionectomy – dysplasia, tumor, gliosis etc.
  - Hemispherectomy
- Interruption of pathways (Disconnective)
  - Corpus Callosotomy
  - Stereotactic ablation
- Decrease brain excitability by stimulating inhibition (neuromodulation)
- Prevent neuronal synchronization – multiple subpial transection

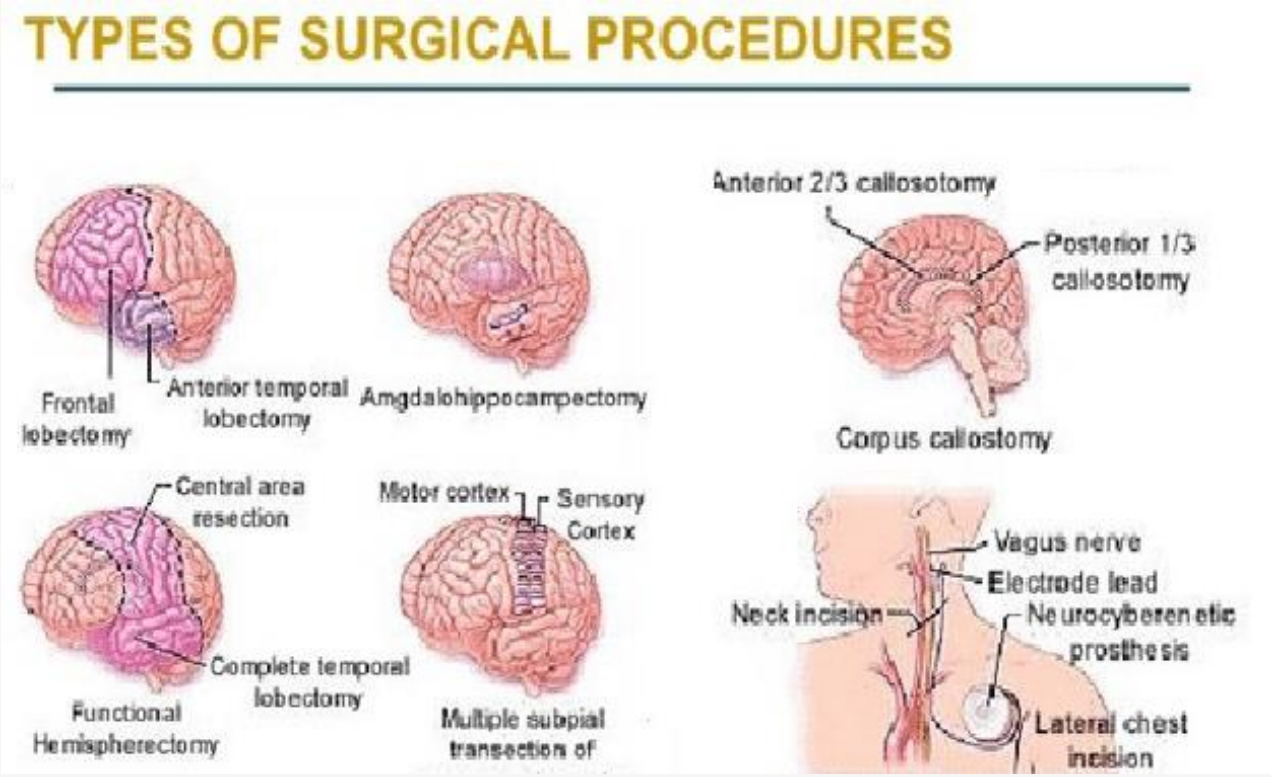


Image: Zali, Alireza & Seddighi, Amirsaied & Nikouei, Amir. (2018). Overview of Seizure and Epilepsy Syndromes and Their Multidisciplinary Managemer
4. 150-155. 10.22038/rcm.2019.25805.1213.

Neuromodulation[8,11]

Vagal Nerve Stimulator (VNS)

Indications - adjunctive therapy in medically refractory/intractable epilepsy

Surgically implanted neuromodulation device that is used to stimulate the vagus nerve to help stop seizures.

FDA approval: 4 and up

Responsive Neurostimulation (RNS)

Indications – treatment of focal epilepsy (1-2 foci) who have failed 2 or more medical treatments

Closed loop Neuromodulation with device seated in the skull with wires placed directly in the brain to target specific areas

FDA approval: 18 and up

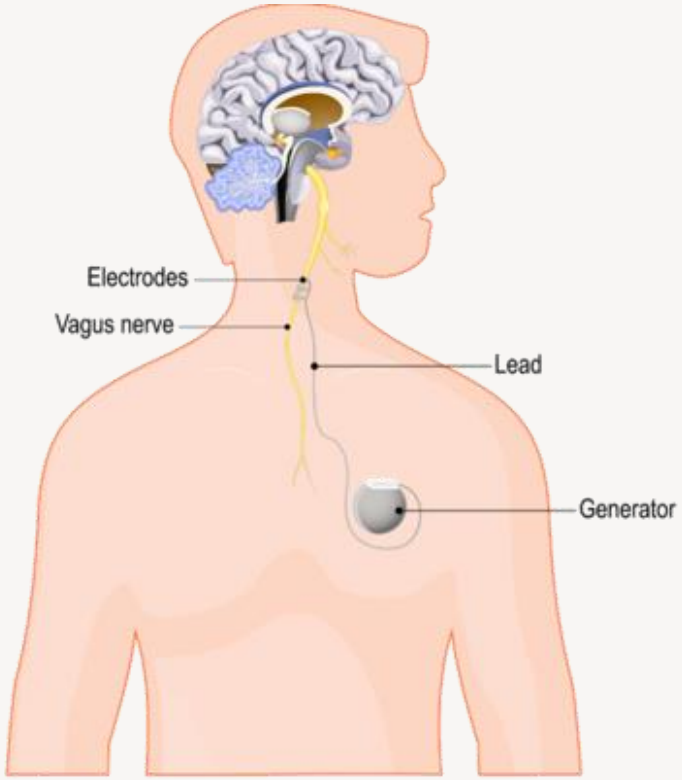
Vagal Nerve Stimulator[8,11]

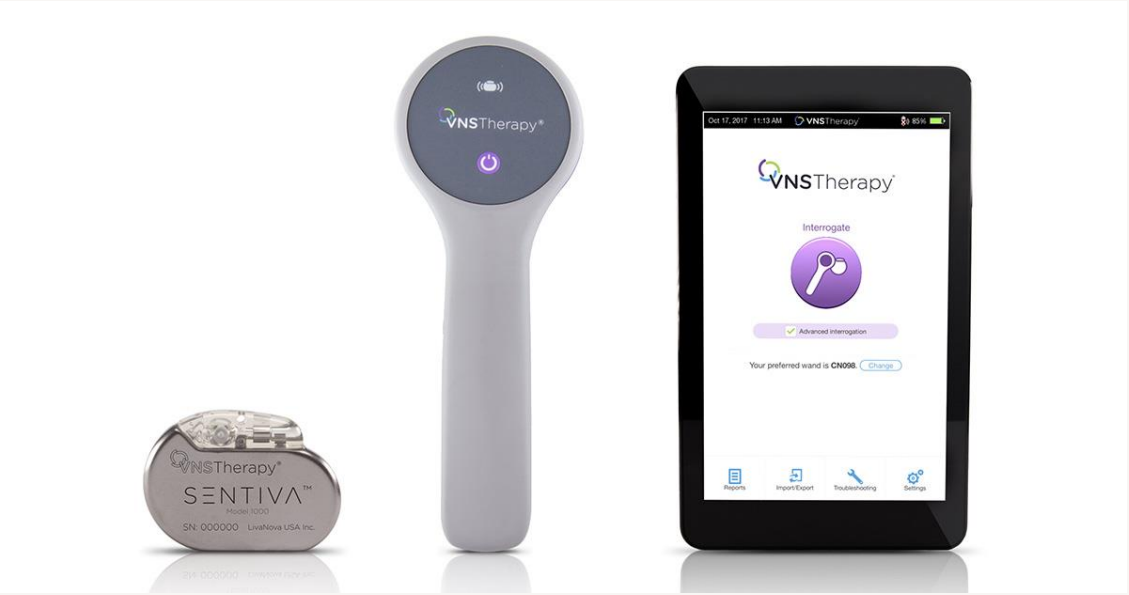
Mechanisms

- Inhibits the development of seizure kindling associated with noradrenaline
- Increase cerebral blood flow to certain areas of the brain
- Increases level of GABA
- Immediate and long-term changes

Device

- Implanted electrode coiled around left vagus nerve
- Implanted pulse generator placed left chest wall
- Lead connecting the two
- Magnet – home stimulation
- Tablet/wand - provider use



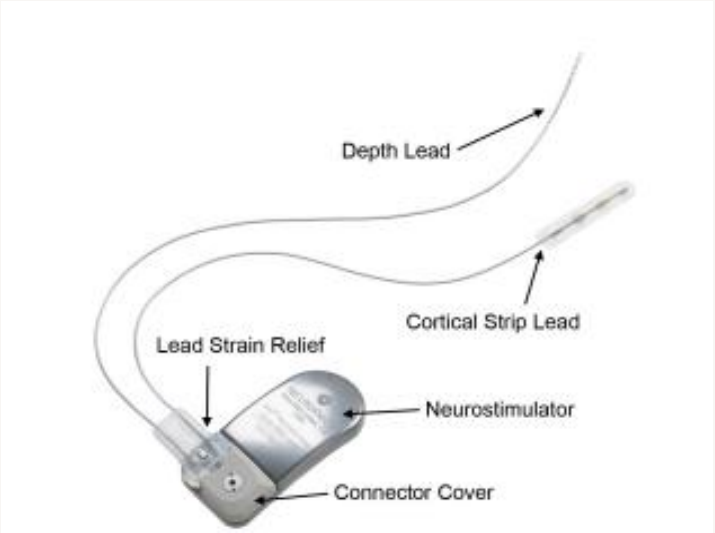


Responsive Neurostimulation[11,12]

Mechanisms
- Continuously monitors brain waves
- Detects pattern of abnormal electrical activity at the source
- Responds – desynchronization with goal of preventing propagation of ictal activity
- Records data over months/years to identify patterns etc

Data
- 75% median seizure reduction at 9 years
- 21% seizure free at end of trial

Device
- Neurostimulator
- Cortical strip lead
- Depth lead
- Remote monitor tablet
- Wand – to place over RNS
- Magnet - home use



NEUROPACE

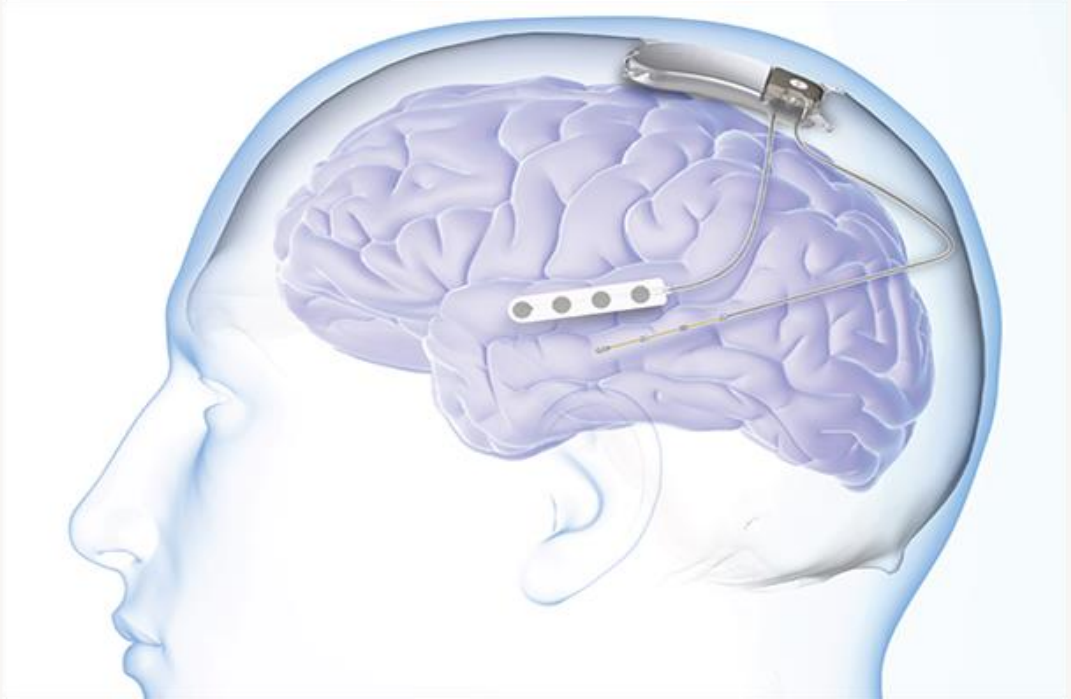
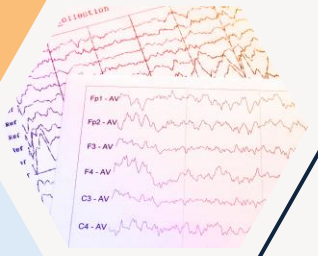


Image: Neuropace RNS System Physician Manual https://www.neuropace.com/wp-content/uploads/2021/02/neuropace-rns-system-manual-320.pdf

References

1. Beniczky S, Trinka E, Wirrell E, et al. Updated classification of epileptic seizures: Position paper of the International League Against Epilepsy. Epilepsia. 2025;66(6):1804-1823. doi:10.1111/epi.18338
2. Moosa ANV. Antiepileptic Drug Treatment of Epilepsy in Children. Continuum (Minneap Minn). 2019;25(2):381-407. doi:10.1212/CON.0000000000000712
3. Shih JJ, Tatum WO, Rudzinski LA. New drug classes for the treatment of partial onset epilepsy: focus on perampanel. Ther Clin Risk Manag. 2013;9:285-293. doi:10.2147/TCRM.S37317
4. Patsalos PN, St. Louis EK. The Epilepsy Prescriber's Guide to Antiepileptic Drugs. 3rd ed. Cambridge University Press; 2018.
5. Trinka E, Cock H, Hesdorffer D, et al. A definition and classification of status epilepticus--Report of the ILAE Task Force on Classification of Status Epilepticus. Epilepsia. 2015;56(10):1515-1523. doi:10.1111/epi.13121
6. Glauser T, Shinnar S, Gloss D, et al. Evidence-Based Guideline: Treatment of Convulsive Status Epilepticus in Children and Adults: Report of the Guideline Committee of the American Epilepsy Society. Epilepsy Curr. 2016;16(1):48-61. doi:10.5698/1535-7597-16.1.48
7. Raimer P, Besunder J, Gunkelman S, Zawadzki L, Ruggles C. Akron Children's Hospital Convulsive Status Epilepticus Algorithm. 2021. Adapted from: Glauser T, Shinnar S, Gloss D, et al. Evidence-Based Guideline: Treatment of Convulsive Status Epilepticus in Children and Adults: Report of the Guideline Committee of the American Epilepsy Society. Epilepsy Curr. 2016;16(1):48-61. doi:10.5698/1535-7597-16.1.48
8. Jayalakshmi S, Panigrahi M, Nanda SK, Vadapalli R. Surgery for childhood epilepsy. Ann Indian Acad Neurol. 2014;17(Suppl 1):S69-S79. doi:10.4103/0972-2327.128665
9. D'Andrea Meira I, Romão TT, Pires do Prado HJ, Krüger LT, Pires MEP, da Conceição PO. Ketogenic Diet and Epilepsy: What We Know So Far. Front Neurosci. 2019;13:5. Published 2019 Jan 29. doi:10.3389/fnins.2019.00005
10. Zali, Alireza & Seddighi, Amirsaied & Nikouei, Amir. (2018). Overview of Seizure and Epilepsy Syndromes and Their Multidisciplinary Management. 4. 150-155. 10.22038/rcm.2019.25805.1213.
11. Gouveia FV, Warsi NM, Suresh H, Matin R, Ibrahim GM. Neurostimulation treatments for epilepsy: Deep brain stimulation, responsive neurostimulation and vagus nerve stimulation. Neurotherapeutics. 2024;21(3):e00308. doi:10.1016/j.neurot.2023.e00308
12. Neuropace RNS System Physician Manual https://www.neuropace.com/wp-content/uploads/2021/02/neuropace-rns-system-manual-320.pdf



Thank you!

Questions?

Francesca Shick, MSPAS, PA-C

Fshick@akronchildrens.org

NDSC – 330-543-8050