TINTIN REVIEW SEIZURE

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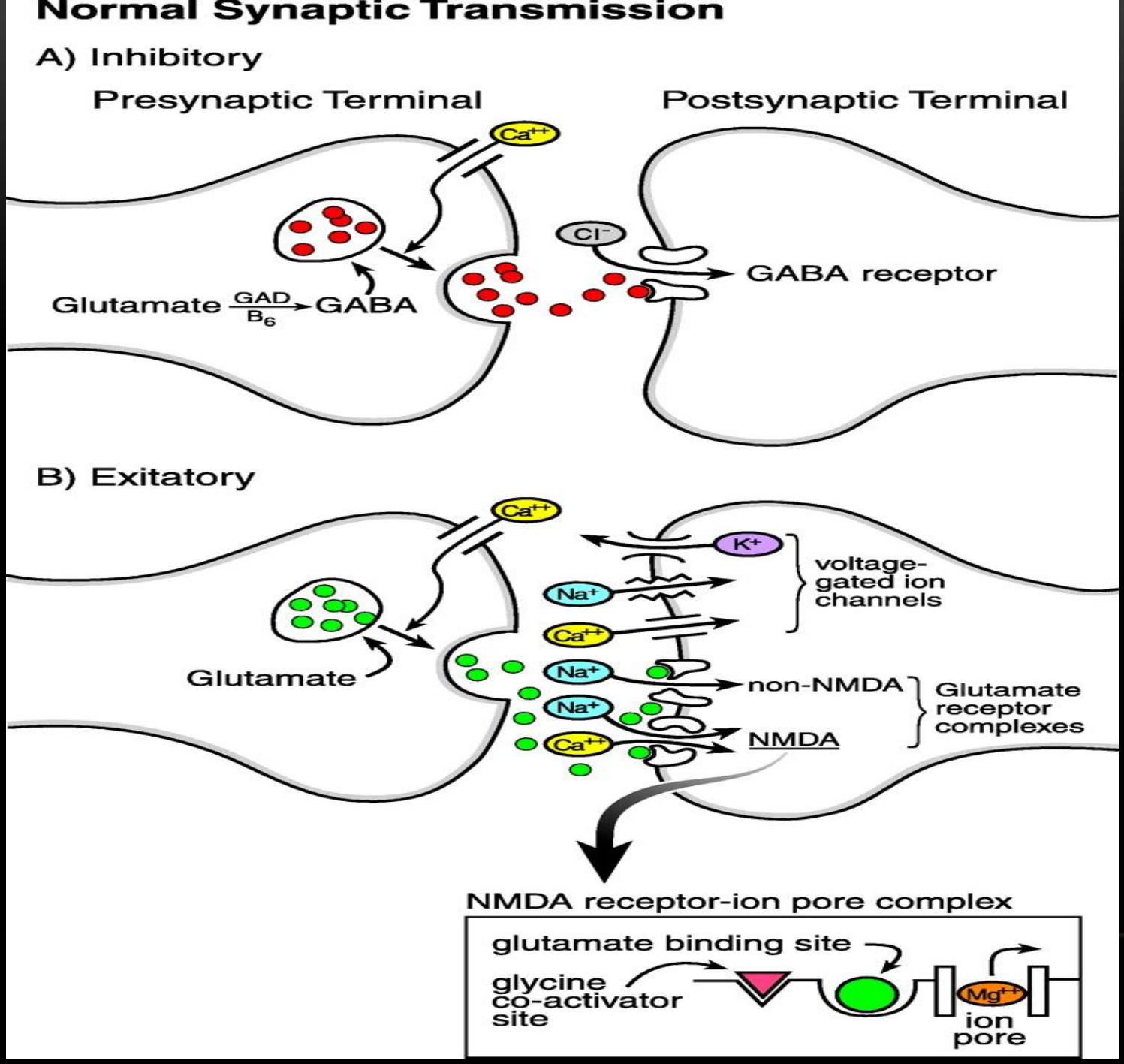
INTRODUCTION AND PATHOPHYSIOLOGY

- Seizure is an episode of abnormal neurologic function caused by in appropriate electrical discharge of brain neuron
- Primary (idiopathic)
- Secondary (symptomatic)
- Epilepsy


Normal Synaptic Transmission
A) Inhibitory
Presynaptic Terminal
Postsynaptic Terminal
Ca++
Cl−
GABA receptor
Glutamate GAD B6 GABA
B) Exitatory
Ca++
K+
voltage-gated ion channels
Na+
Ca++
Glutamate
Na+
non-NMDA
Glutamate receptor complexes
Na+
NMDA
Ca++
NMDA receptor-ion pore complex
glutamate binding site
glycine co-activator site
Mg++
ion pore

INTRODUCTION AND PATHOPHYSIOLOGY

- Provoked seizure has acute precipitate within 7 days
- Unprovoked seizure has no acute precipitate
- Status epilepticus is seizure activity for ≥5 minutes or two or more seizures without regaining consciousness between seizures
- Refractory status epilepticus is persistent seizure activity despite the IV administration of adequate amounts of two antiepileptic agents.

SEIZURE CLASSIFICATION

TABLE 171-1 Classification of Seizures

Generalized seizures (consciousness always lost)

Tonic-clonic seizures (grand mal)

Absence seizures (petit mal)

Others (myoclonic, tonic, clonic, or atonic seizures)

Partial (focal) seizures

- Simple partial (no alteration of consciousness)
- Complex partial (consciousness impaired)
- Partial seizures with secondary generalization (Jacksonian march)

Unclassified (inadequate information)

CLINICAL FEATURES

- History
  - Determine whether the episode was truly a seizure
  - History of the details of the attack from the patient and any bystanders
  - Patient is a known epileptic, clarify the baseline seizure pattern
  - If the attack is consistentv with the previous seizure pattern, identify precipitating factors of the current seizure

TABLE 171-2 Common Causes of Provoked (Secondary) Seizures

Trauma (recent or remote)

Intracranial hemorrhage (subdural, epidural, subarachnoid, intraparenchymal)

Structural CNS abnormalities

Vascular lesion (aneurysm, arteriovenous malformation)

Mass lesions (primary or metastatic neoplasms)

Degenerative neurologic diseases

Congenital brain abnormalities

Infection (meningitis, encephalitis, abscess)

Metabolic disturbances

Hypo- or hyperglycemia

Hypo- or hypernatremia

Hyperosmolar states

Uremia

Hepatic failure

Hypocalcemia, hypomagnesemia (rare)

Toxins and drugs (many)

Cocaine, lidocaine, antidepressants, theophylline, isoniazid

Mushroom toxicity (*Gyromitra* spp.)

Hydrazine (rocket fuels)

Alcohol or drug withdrawal

Eclampsia of pregnancy (may occur up to 8 weeks postpartum)

Hypertensive encephalopathy

Anoxic-ischemic injury (cardiac arrest, severe hypoxemia)

CLINICAL FEATURES

- PHYSICAL EXAMINATION
  - Immediately obtain a complete set of vital signs and a point-of-care glucose determination
  - initial exam on checking for injuries
  - Perform a directed, complete neurologic examination and subsequent serial examinations

DIAGNOSIS

- Clinical features that help to distinguish seizures from other
  - Abrupt onset and termination
  - Lack of recall
  - Purposeless movements or behavior during the attack
  - Followed by a period of postictal confusion and lethargy except for simple absence attacks or simple partial seizures

DIFFERENTIAL DIAGNOSIS

TABLE 171-3 Paroxysmal Disorders: Differential Diagnosis

Seizures
Syncope
Pseudoseizures or psychogenic seizures
Hyperventilation syndrome
Migraine headache
Movement disorders

LABORATORY TESTING

- A seizure may result in a lactate driven , wide anion gap metabolic acidosis.
- Lactate abnormalities will clear within 30 minutes
- The prolactin level may also be elevated for a brief period (15 to 60 minutes) immediately after a seizure

IMAGING

- A noncontrast CT is an appropriate screening tool
- CT scan of the head in the ED for patients with a first-ever seizure or a change in established seizure patterns
- CT scan if there is any concern for an acute intracranial process based on history, comorbidities, or findings on physical examination

LUMBAR PUNCTURE

- Lumbar puncture in the setting of an acute seizure is indicated
- if the patient is febrile or immunocompromised or if subarachnoid hemorrhage is suspected
- and the noncontrast head CT is normal

ELECTROENCEPHALOGRAPHY

- Emergent EEG can be considered in the evaluation of a patient with persistent, unexplained altered mental status to evaluate for nonconvulsive status epilepticus, subtle status epilepticus, paroxysmal attack

TREATMENT OF UNCOMPLICATED SEIZURES

PATIENTS WITH ACTIVE SEIZURES

- supportive and patient protective measures
- once the attack subsides, clear the airway. Suction and airway adjuncts should be readily available
- It is not necessary or recommended to give IV anticonvulsant medications during the course of an uncomplicated seizure

TREATMENT OF UNCOMPLICATED SEIZURES

PATIENTS WITH A HISTORY OF SEIZURES

- Identify and correct potential precipitants that may lower the seizure threshold
- In the known or suspected noncompliant patient, obtain a serum anticonvulsant level before administering a supplemental or loading dose to avoid drug toxicity
- If anticonvulsant levels are adequate and the patient has had a single attack, specific treatment may not be needed if the seizure pattern and frequency fall within the expected range for the patient

TREATMENT OF UNCOMPLICATED SEIZURES

PATIENTS WITH A FIRST UNPROVOKED SEIZURE

- Guidelines do not recommend hospital admission or initiation of anticonvulsant therapy in the patient with a first unprovoked seizure, as long as the patient has returned to neurologic baseline.
- patients with a first unprovoked seizure who have a normal neurologic examination, no acute or chronic medical comorbidities, normal diagnostic testing including noncontrast head CT, and normal mental status can safely be discharged from the ED

SPECIAL POPULATIONS

HUMAN IMMUNODEFICIENCY VIRUS

- Perform an extensive investigation for the cause of the seizure.
- If no space-occupying lesion is identified on noncontrast head CT scan and
- there is no evidence of increased intracranial pressure, perform a lumbar puncture to exclude CNS infection.
- If no explanation for seizures is found, then obtain a contrast-enhanced head CT or MRI.

SPECIAL POPULATIONS

NEUROCYSTICERCOSIS

- Seizures in neurocysticercosis are typically controlled by antiepileptic monotherapy
- Definitive treatment of neurocysticercosis is controversial and highly variable, depending on the number, location, and viability of the parasites within the CNS
- Antiparasitics (praziquantel and albendazole) and steroids are best initiated in consultation with an infectious disease specialist or neurologist

SPECIAL POPULATIONS

PREGNANCY

- The management of seizures (or control of epilepsy) during pregnancy requires a multidisciplinary approach
- with the addition of an obstetric evaluation to determine gestational age and fetal well-being
- When a woman beyond 20 weeks of gestation develops seizures in the setting of hypertension, edema, and proteinuria, the condition is defined as *eclampsia*. Magnesium sulfate has long been used to treat eclampsia with good results

SPECIAL POPULATIONS

ALCOHOL ABUSE

- Seizures and alcohol use are associated through missed doses of medication,sleep deprivation as an epileptogenic trigger increased propensity for head injury, toxic co-ingestions, electrolyte abnormalities, and withdrawal seizures
- Benzodiazepines in doses sufficient to manage withdrawal symptoms will usually afford adequate protection from acute seizures
- Evaluate and treat the alcohol-abusing patient with a first seizure as any other patient with a first-time seizure

STATUS EPILEPTICUS

- Status epilepticus is a single seizure ≥5 minutes in length or two or more seizures without recovery of consciousness between seizures.
- Status epilepticus is a neurologic emergency, and treatment should be initiated in all patients with continuous seizure activity lasting more than 5 minutes.

TREATMENT OF STATUS EPILEPTICUS

- The goal of treatment is seizure control as soon as possible and within 30 minutes of presentation

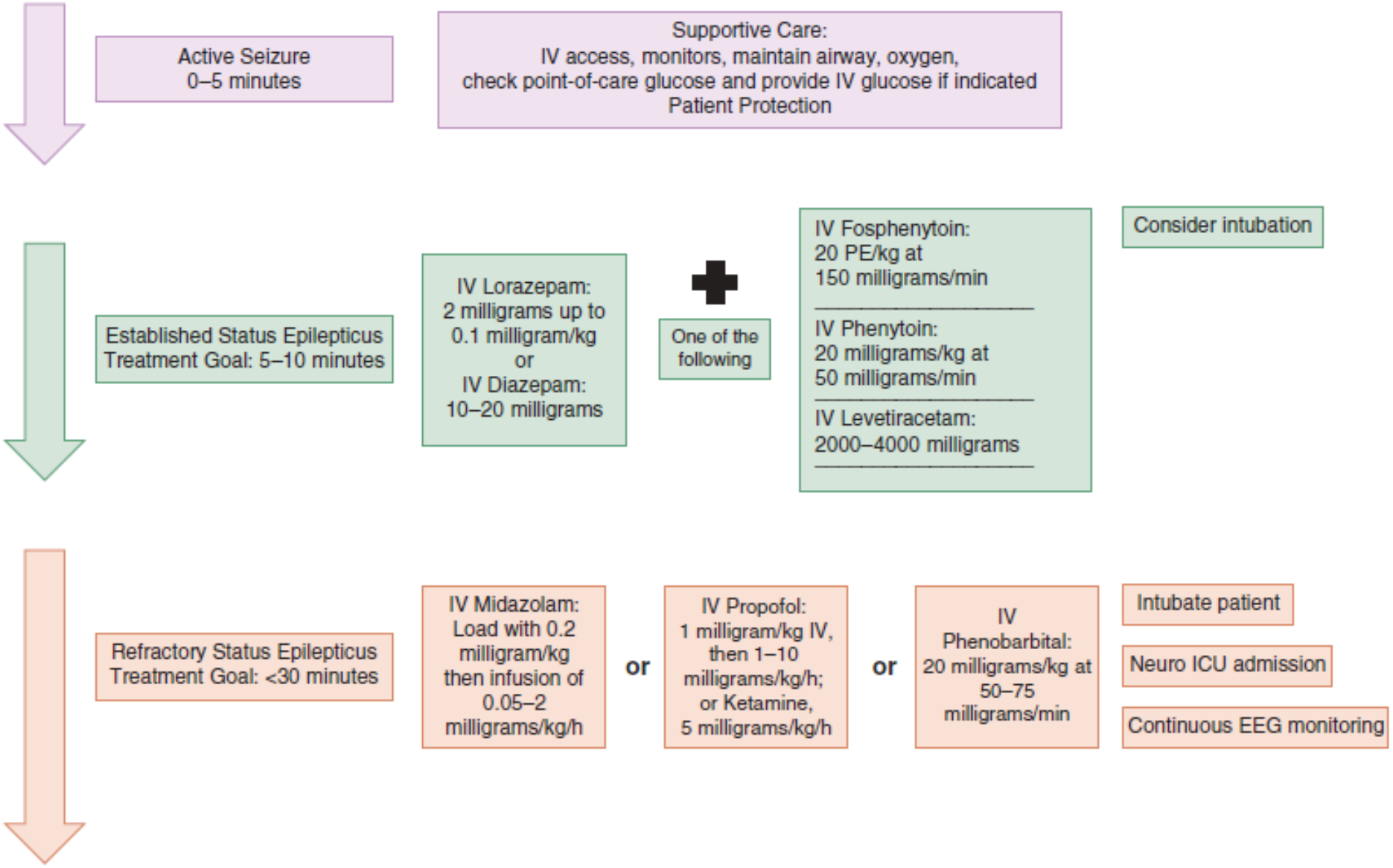


FIGURE 171-1. Guidelines for management of active seizures and status epilepticus. ICU = intensive care unit; PE = phenytoin equivalents.

THANK YOU