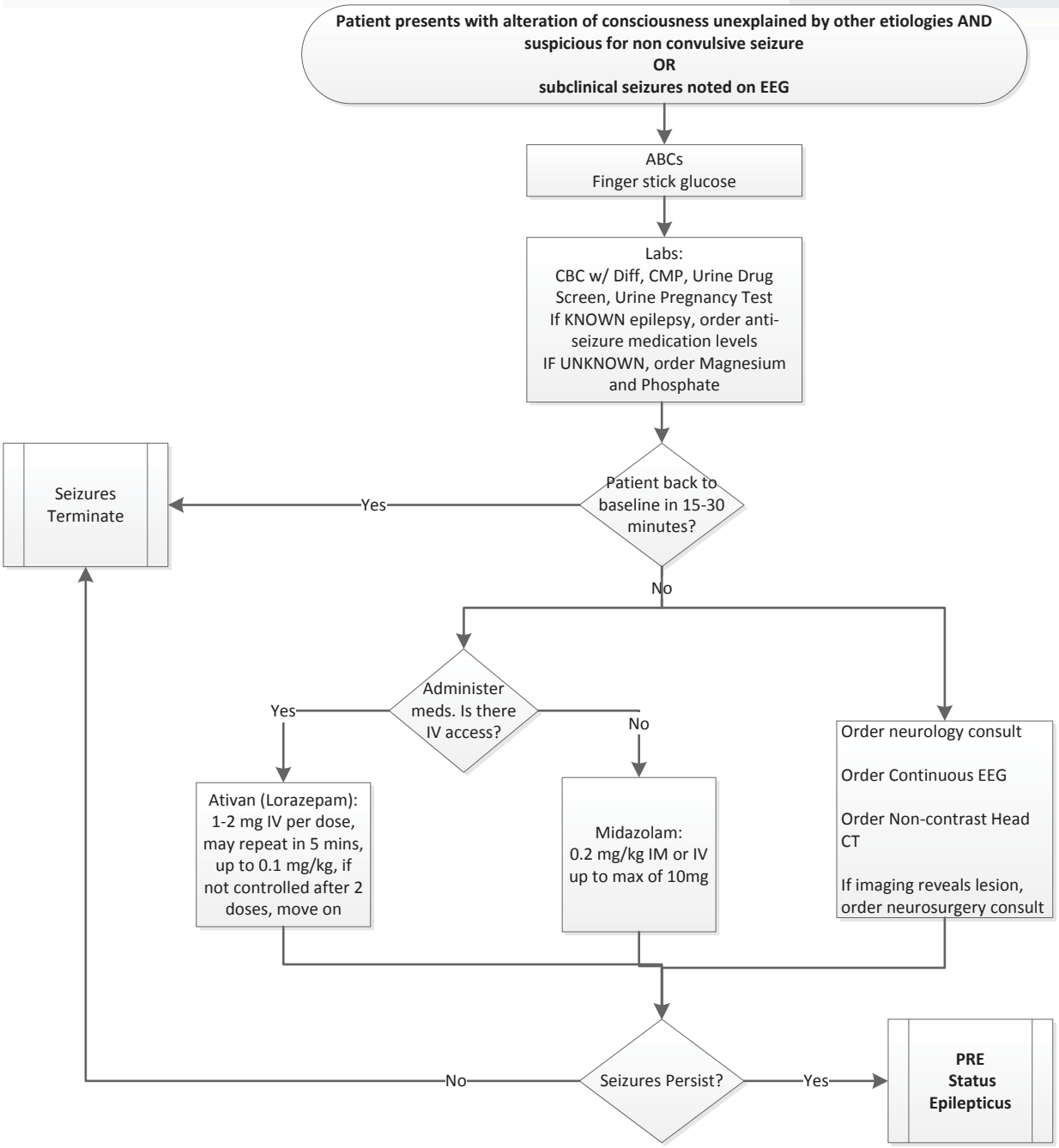
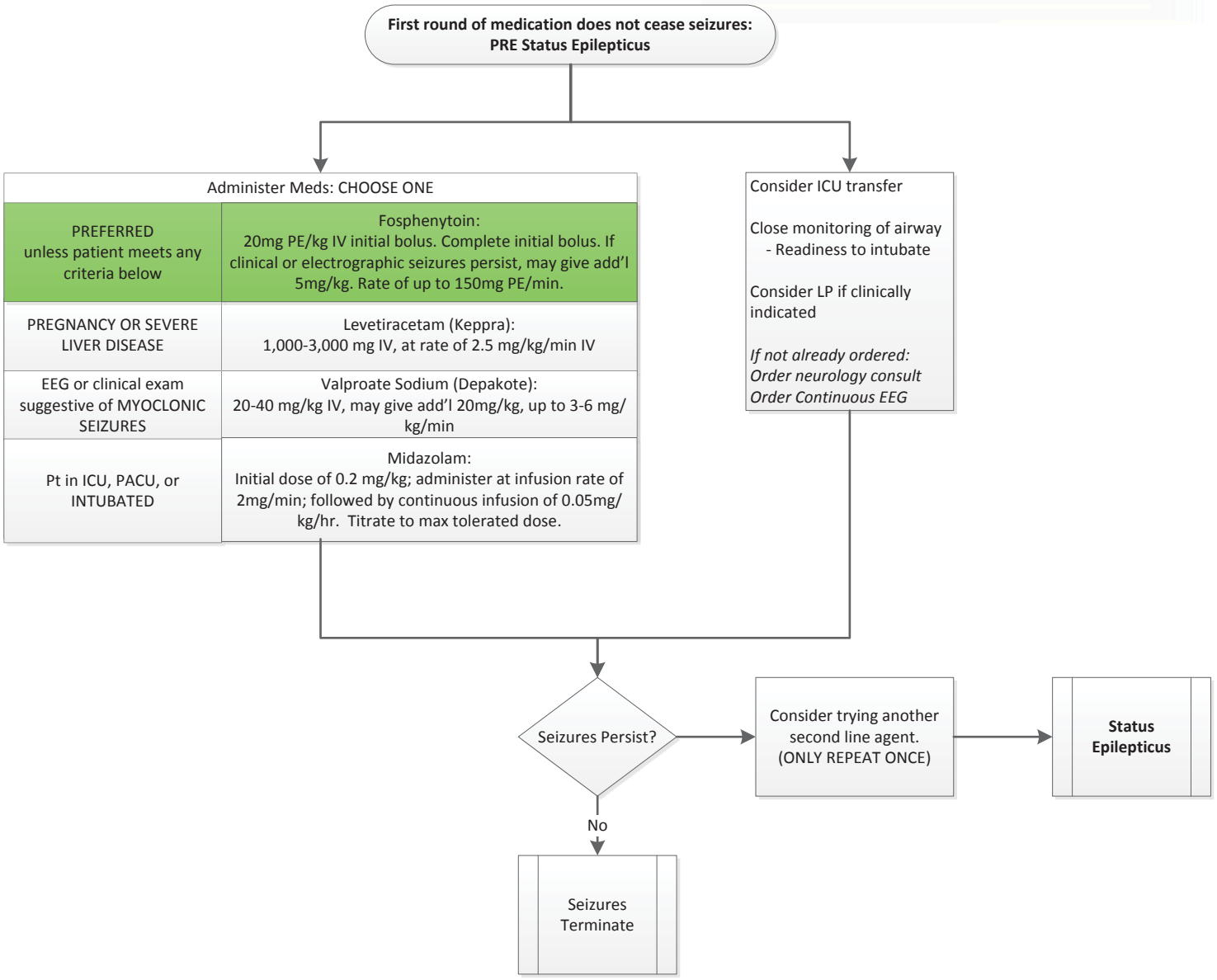
NonConvulsive Seizure

December 16, 2014




First round of medication does not cease seizures: PRE Status Epilepticus
Administer Meds: CHOOSE ONE
PREFERRED unless patient meets any criteria below
Fosphenytoin: 20mg PE/kg IV initial bolus. Complete initial bolus. If clinical or electrographic seizures persist, may give add'l 5mg/kg. Rate of up to 150mg PE/min.
PREGNANCY OR SEVERE LIVER DISEASE
Levetiracetam (Keppra): 1,000-3,000 mg IV, at rate of 2.5 mg/kg/min IV
EEG or clinical exam suggestive of MYOCLONIC SEIZURES
Valproate Sodium (Depakote): 20-40 mg/kg IV, may give add'l 20mg/kg, up to 3-6 mg/kg/min
Pt in ICU, PACU, or INTUBATED
Midazolam: Initial dose of 0.2 mg/kg; administer at infusion rate of 2mg/min; followed by continuous infusion of 0.05mg/kg/hr. Titrate to max tolerated dose.
Consider ICU transfer
Close monitoring of airway - Readiness to intubate
Consider LP if clinically indicated
If not already ordered: Order neurology consult Order Continuous EEG
Seizures Persist?
Consider trying another second line agent. (ONLY REPEAT ONCE)
Status Epilepticus
No
Seizures Terminate

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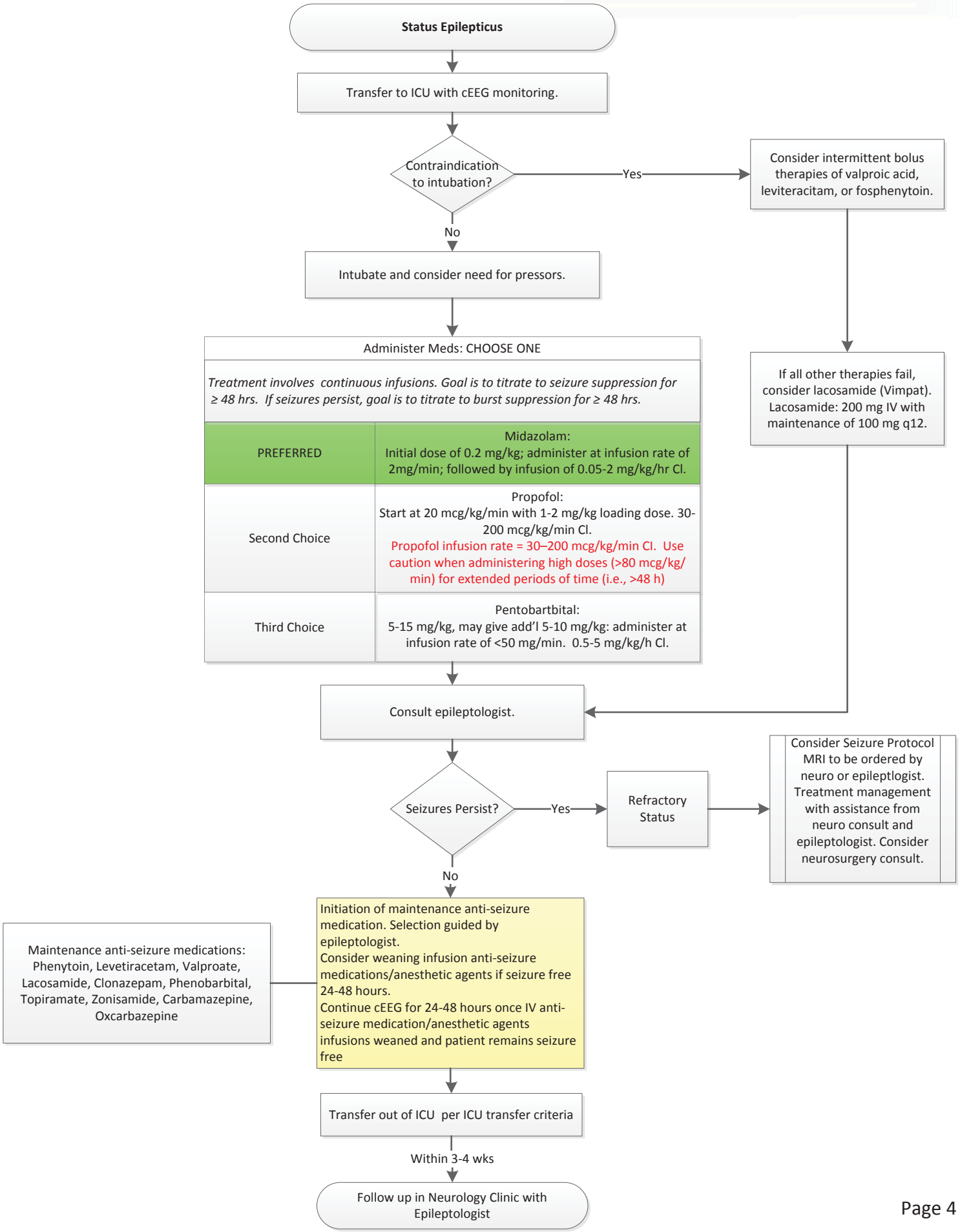
Return to Pathway


Status Epilepticus
Transfer to ICU with cEEG monitoring.
Contraindication to intubation?
Yes
Consider intermittent bolus therapies of valproic acid, leviteracitam, or fosphenytoin.
No
Intubate and consider need for pressors.
Administer Meds: CHOOSE ONE
Treatment involves continuous infusions. Goal is to titrate to seizure suppression for ≥ 48 hrs. If seizures persist, goal is to titrate to burst suppression for ≥ 48 hrs.
PREFERRED
Midazolam: Initial dose of 0.2 mg/kg; administer at infusion rate of 2mg/min; followed by infusion of 0.05-2 mg/kg/hr CI.
Second Choice
Propofol: Start at 20 mcg/kg/min with 1-2 mg/kg loading dose. 30-200 mcg/kg/min CI. Propofol infusion rate = 30–200 mcg/kg/min CI. Use caution when administering high doses (>80 mcg/kg/min) for extended periods of time (i.e., >48 h)
Third Choice
Pentobartbital: 5-15 mg/kg, may give add'l 5-10 mg/kg: administer at infusion rate of <50 mg/min. 0.5-5 mg/kg/h CI.
If all other therapies fail, consider lacosamide (Vimpat). Lacosamide: 200 mg IV with maintenance of 100 mg q12.
Consult epileptologist.
Seizures Persist?
Yes
Refractory Status
Consider Seizure Protocol MRI to be ordered by neuro or epileptlogist. Treatment management with assistance from neuro consult and epileptologist. Consider neurosurgery consult.
No
Initiation of maintenance anti-seizure medication. Selection guided by epileptologist.
Consider weaning infusion anti-seizure medications/anesthetic agents if seizure free 24-48 hours.
Continue cEEG for 24-48 hours once IV anti-seizure medication/anesthetic agents infusions weaned and patient remains seizure free
Maintenance anti-seizure medications: Phenytoin, Levetiracetam, Valproate, Lacosamide, Clonazepam, Phenobarbital, Topiramate, Zonisamide, Carbamazepine, Oxcarbazepine
Transfer out of ICU per ICU transfer criteria
Within 3-4 wks
Follow up in Neurology Clinic with Epileptologist

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Initiation of maintenance anti-seizure medication. Selection guided by epileptologist.

Consider weaning infusion anti-seizure medications/ anesthetic agents if seizure free 24-48 hours.

Continue cEEG for 24-48 hours once IV anti-seizure medication/anesthetic agents infusions weaned and patient remains seizure free

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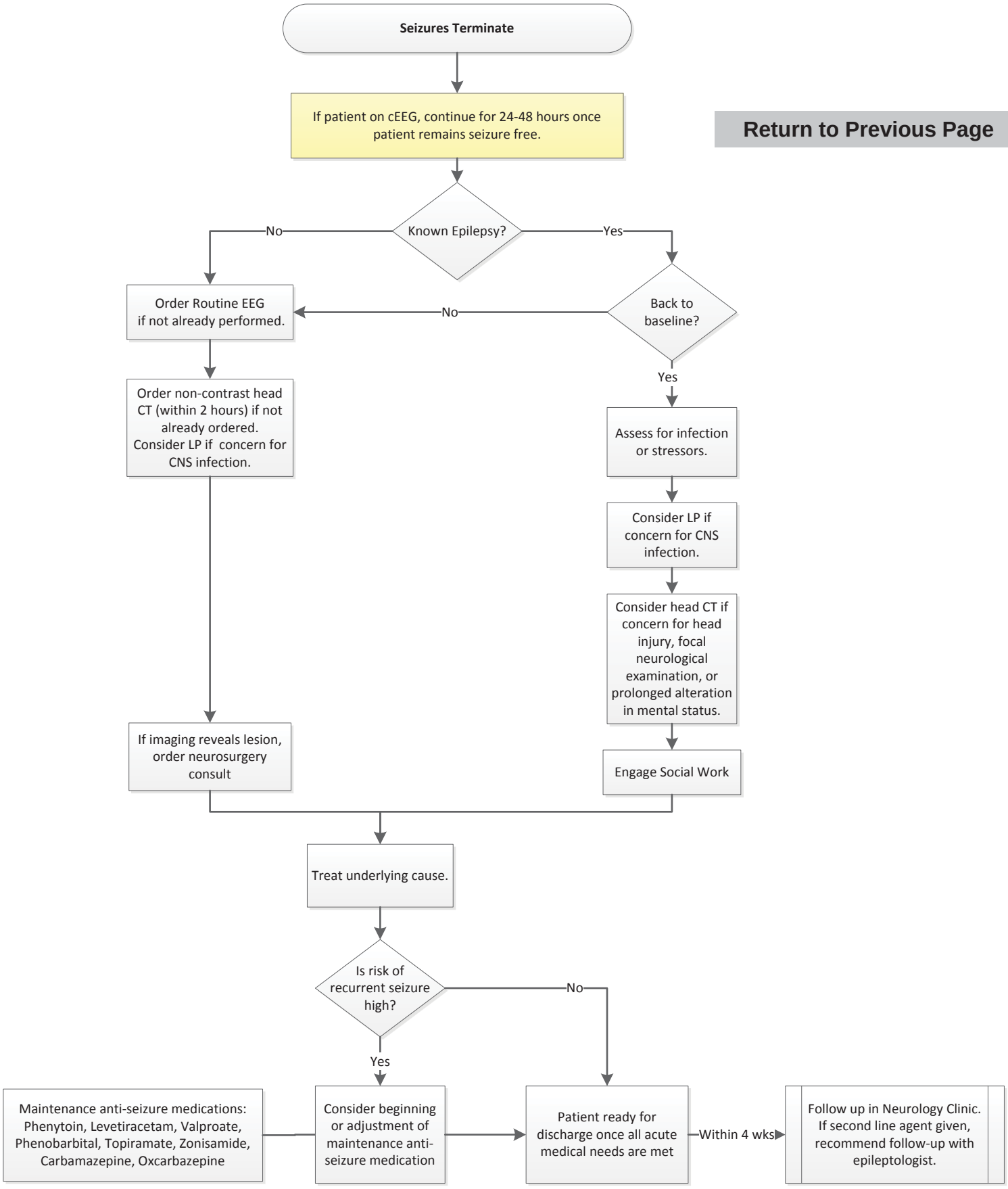

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If patient on cEEG, continue for 24-48 hours once patient remains seizure free.

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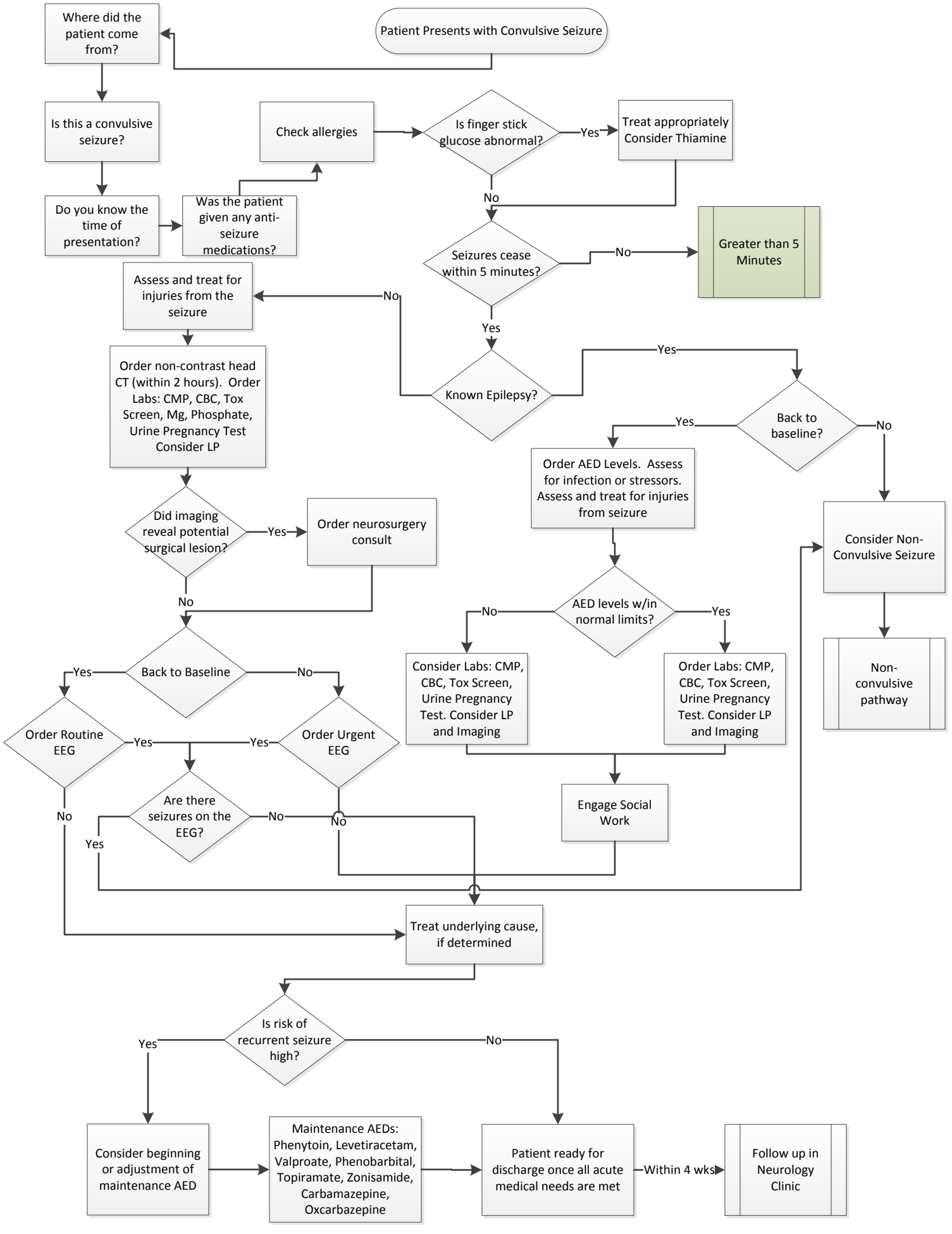
Convulsive Seizure



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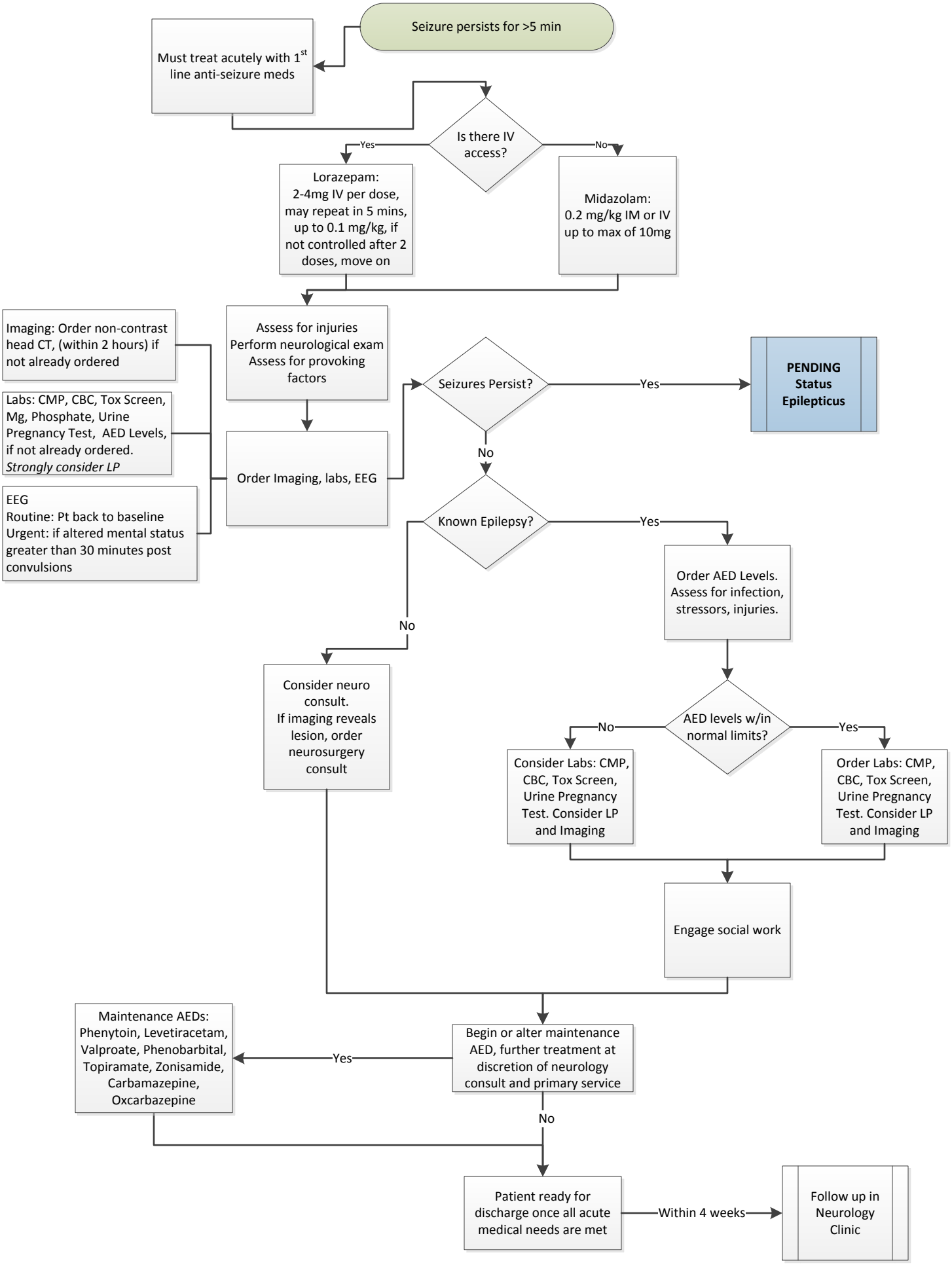

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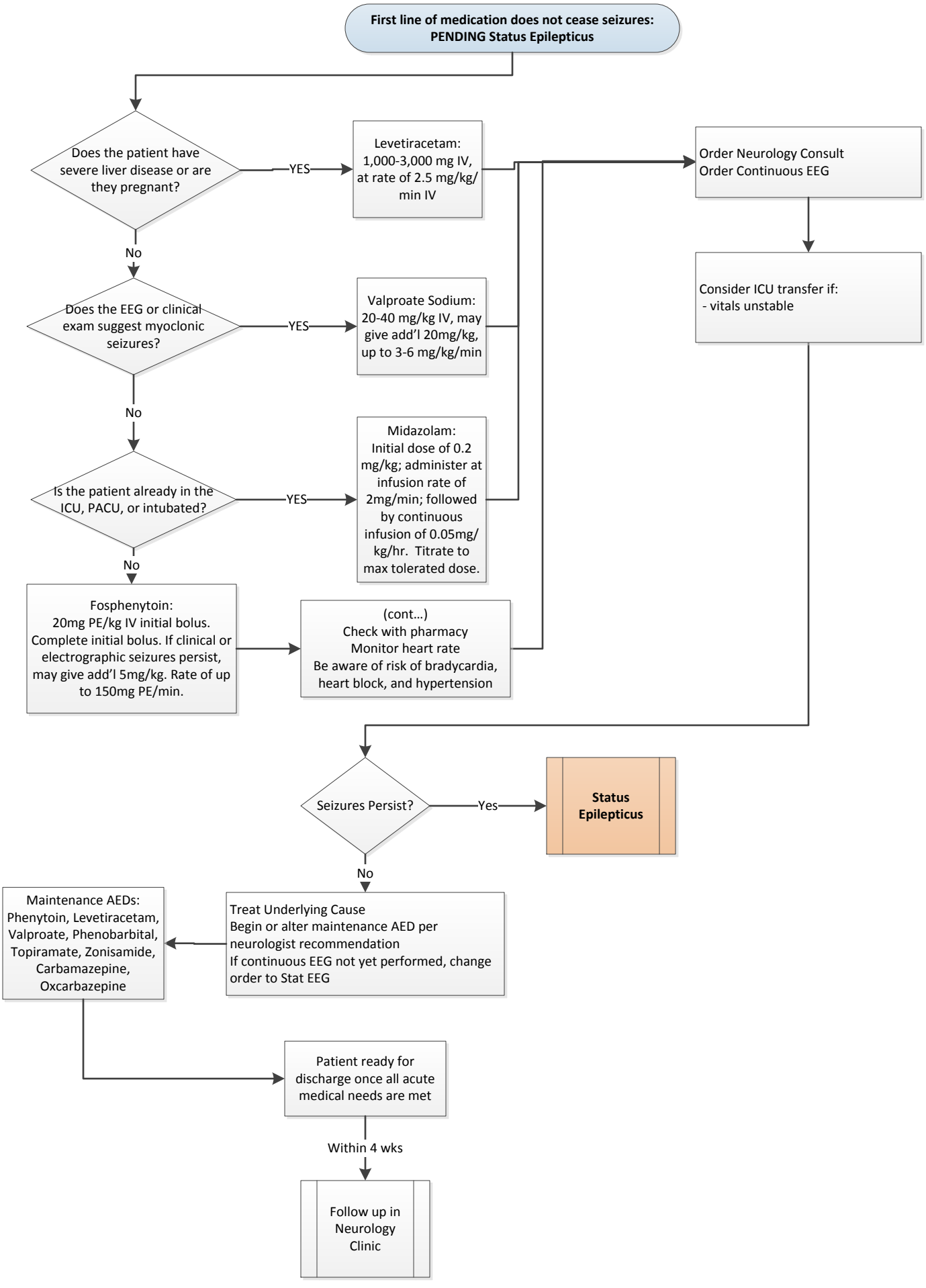

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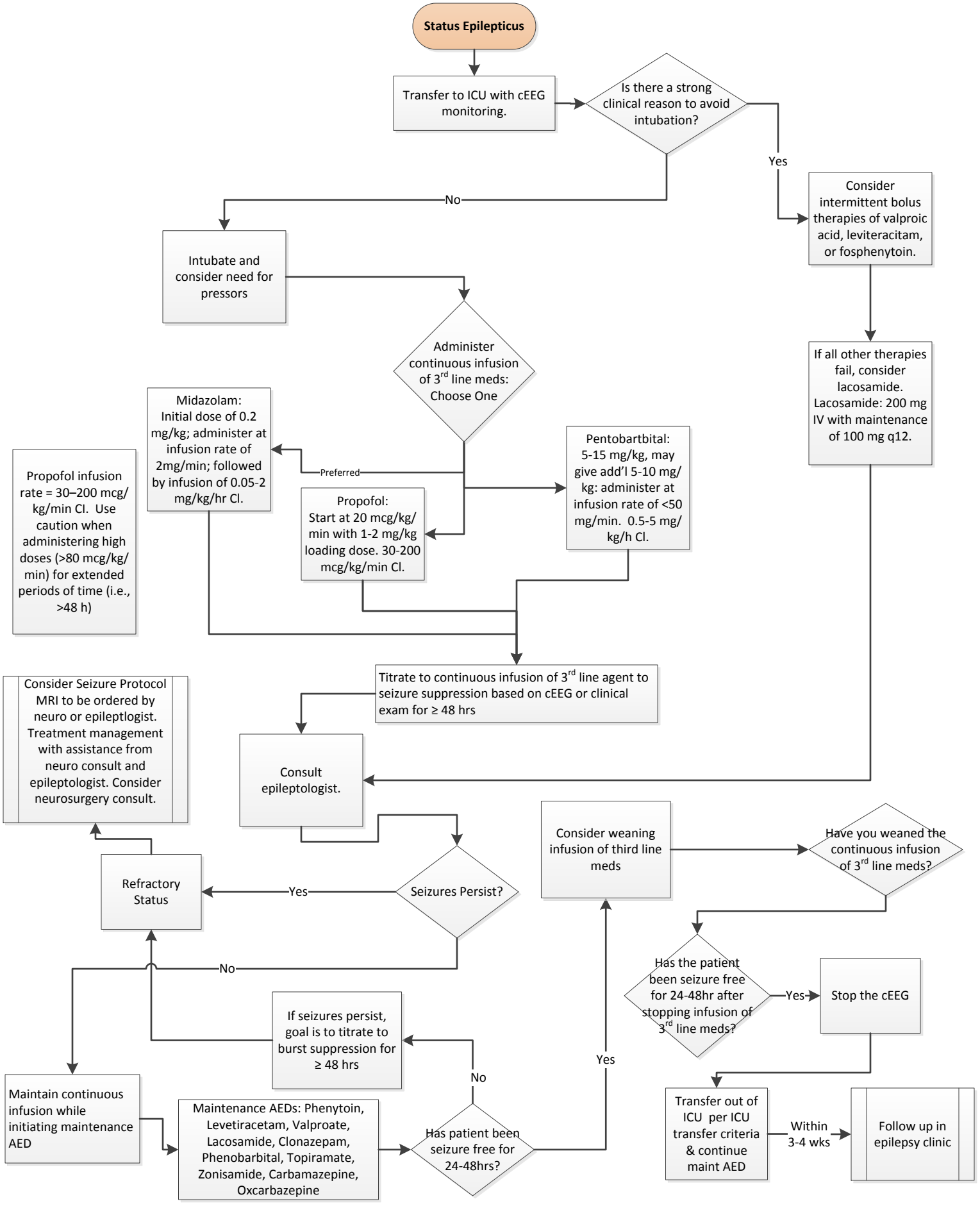

Management algorithm for generalized CONVULSIVE status epilepticus

NB: Algorithm intended for *ongoing* convulsive activity > 5 min or *recurrent convulsive seizures* without regaining consciousness

See reverse for management options for non-convulsive status or frequent clinical seizures

0-5 minutes

- Perform Basic Life Support: Airway, Breathing, Circulation; Give supplemental oxygen
- Obtain IV access, blood glucose, vital signs, blood pressure, EKG, and cardiac monitoring
- Send CMP, CBC, ABG, alcohol and AED levels, urine pregnancy, and toxicology screen
- Call Rapid Response (5-8893); Be prepared to call a code (5-5555) and intubate if necessary

0-5 minutes

IV Thiamine 100 mg; **IV Dextrose** 50%, 50 cc
If hypoglycemic or alcoholic or if glucose or history unavailable

IV Lorazepam 0.1 mg/kg **up to 4mg/dose**
May repeat q 5 min
(max 8-10 mg or respiratory depression)

Alternatives, if no IV access:
IM Midazolam 10 mg (max 10 mg)
OR
IM Lorazepam 4 mg (max 10 mg)
OR
Rectal Diazepam 20 mg (max 30 mg)

5-10 minutes

IV Fosphenytoin* 20 PE/kg @ 150 PE/min

Alternatives:
IV Phenytoin: 20 mg/kg @ 50 mg/min
OR
IV Valproate** 30 mg/kg @ 3 mg/kg/min

** Monitor EKG and BP with fosphenytoin and phenytoin; Monitor for drug extravasation with phenytoin*
*** Consider valproate as first line in known Idiopathic Generalized Epilepsy; Avoid in women of child-bearing age if possible*

Convulsions CONTINUE

Convulsions STOP

10-20 minutes

- Intubate patient
- Begin IV anesthetic with anti-epileptic properties
  Titrate to EEG and monitor blood pressure

Anesthetic Options:
Midazolam 0.2 mg/kg bolus then 0.05 mg/kg/h
OR
Propofol* 2 mg/kg bolus then 30 mcg/kg/min
OR
Pentobarbital 5 mg/kg bolus then 0.5 mg/kg/h

** Caution with prolonged use and high doses of propofol due to increased risk of propofol infusion syndrome;*
See order set for rates > 65 mcg/kg/min

Obtain Head CT

Persistent altered mental status

Obtain continuous EEG Monitoring†

† Continuous EEG Monitoring should be obtained for all patients not recovering baseline mental status - including those receiving IV anesthesia

Alternative anti-epileptic drugs for frequent seizures, non-convulsive status epilepticus or refractory status epilepticus:

NB: Most of these medications are **not** first line treatments for **convulsive** status epilepticus but may be appropriate as adjunctive or occasionally first-line treatments for frequent seizures and some cases of non-convulsive status epilepticus.

They may also be used when electrographic seizures persist despite management on the reverse side of the card.

- **IV Lacosamide (Vimpat)** 200-400 mg @ 200 mg/30 min then 200 mg BID*
  Dose adjustment in renal or liver failure
  **monitor EKG and BP during load and for at least 24 hours*
- **IV Levetiracetam (Keppra)** 3000 mg @ 2 mg/kg/min then 1500 mg BID
  Dose adjustment in renal failure
- **IV Phenytoin (Dilantin)** 15-20 mg/kg @ 50 mg/min then 100mg TID*
  Dose adjustment in liver failure, renal failure (CrC l<10ml/min) and age >70
  **monitor EKG and BP during load and for at least 24 hours*
- **IV Phenobarbital** 20 mg/kg at 60 mg/min then 0.5-1.5 mg/kg BID
  Dose adjustment in renal or liver failure
- **IV Valproate** 25-30 mg/kg at 3 mg/kg/min then 1-4 mg/kg/h OR 8-20 mg/kg TID
  Dose adjustment in renal or liver failure
- **PO Clonazepam (Klonopin)** 0.5-1 mg TID
  Dose adjustment in renal or liver failure
- **PO Topiramate (Topamax)** 50-200 mg x 1 then 50 mg PO BID
  Caution with pre-existing metabolic acidosis and propofol

Indications for 24-hour Continuous Video EEG Monitoring:

1. One of the following clinical diagnoses associated with an increased risk of subclinical seizures AND altered or fluctuating mental status (including sedated/intubated patients):
   - Recent clinical evidence of status epilepticus or seizures
   - Traumatic brain injury
   - Intracerebral hemorrhage
   - Subarachnoid hemorrhage
   - Subdural hemorrhage
   - Anoxic brain injury
   - CNS infection
2. Unexplained altered or fluctuating mental status in any patient
3. Subtle clinical signs in patients with coma (e.g. eye twitching/nystagmus)
4. Recurrent clinical seizures

How to obtain emergent video EEG monitoring:

NB: Not all of the above situations require emergent video EEG monitoring, off-hours emergent studies will be triaged by the EEG Physician on call

1. Page the EEG Physician on-call (5-5514)
2. Place an order for a 24-hour VEEG
3. Neurology resident should videotape patient with designated camera if clinical signs can be appreciated at the bedside prior to start of video EEG