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STATUS EPILEPTICUS (SE)

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I. Definitions

A. Prolonged or repetitive epileptic seizures lasting 30 minutes or more

OR

B. A state of repetitive seizures without return to full baseline neurologic function between seizures
II. Demographics

A. Majority of patients with SE do not have idiopathic epilepsy

B. Only about 5% of patients with idiopathic epilepsy ever develop SE

C. Mortality 3% to 30%

D. For every type of seizure there is a corresponding type of SE
III. Causes

A. Sudden discontinuation of antiepileptic meds: most common cause in epilepsy

B. Metabolic derangements:
   - Hypoxia: most important to exclude first emergently
   - Hypoglycemia: next most important to exclude emergently
   - Hyponatremia (next most important to exclude)
   - Hypocalcemia (next most important to exclude)
   - Hypomagnesemia (next most important to exclude)
III. Causes (cont.)

C. Alcohol or sedative (especially benzodiazepines) withdrawal: common

D. Drug intoxication or interaction
   • Any anticholinergic med (including tricyclics and phenothiazines)
   • Aminophylline
   • Cocaine / amphetamines
III. Causes (cont.)

E. Structural abnormalities
   • Stroke, head trauma, tumor, degenerative diseases

F. Infection / inflammation
   • Meningitis / encephalitis / collagen vascular diseases

G. Uremia

H. Congenital or perinatal CNS / metabolic disorders
IV. Complications

A. Hypertension (early), hypotension (late)

Hypoxia, ↑ ICP, acidosis, fever, hyperkalemia, ↑ CPK → rhabdomyolysis → ARF ; CNS bleeds, neuronal death
V. Emergent Rx

1. Secure airway ; O₂ by face mask

2. Check vital signs : start cooling measures if hyperthermic

3. Start IV : usually Normal Saline (best diluent if IV diphenylhydantoin will be given later)

4. Check ChemStrip / O₂ saturation
V. Emergent Rx (cont.)

5. Draw blood for glucose, electrolytes, BUN, creatinine (most important)
   - Ca, Mg, CBC (next most important)
   - ABG if O$_2$ sat. low or respiratory compromise
   - Anticonvulsant levels
   - Consider drug / toxin screen (ETOH at least often useful)
V. Emergent Rx (cont.)

6. If ChemStrip low or any chance of hypoglycemia, give 1 amp D50 IV (dilute to 25% for small children) and consider thiamine 100 mg IV

7. If SZ continue: diazepam 2 mg / min IV (0.2 mg/kg) with repeated doses as needed up to 5 mg in infants and 30 mg in adults, or lorazepam (much longer acting anti-SZ effect) 1 to 2 mg/min (0.04 mg/kg) IV up to 10 to 15 mg. Watch for respiratory depression: may need intubation.
V. Emergent Rx (cont.)

8. Follow diazepam or lorazepam with phenytoin 50 mg/min (25 mg/min in kids) IV to 18 mg/kg dose

9. If SZ persist:

Phenobarbital IV 100 mg/min up to 20 mg/kg or diazepam drip (100 mg in 50 ml D5W, run at 40 ml/hr); then expect to endotracheally intubate since these almost always will cause respiratory depression or apnea.
V. Emergent Rx (cont.)

10. If SZ still persist:

   Paraldehyde 4 % (20 ml in 500 cc NS) at 1 cc/kg/hr IV and/or lidocaine 1 mg/kg IV bolus then drip at 1 to 4 mg/min

11. If SZ still persist consider general anesthesia with halothane / paralysis

12. Once SZ stop, then consider further workup with head CT, LP, etc.

   If etiology turns out to be hyponatremia, consider use of 3 % NaCl IV for Rx (initial rate about 100 cc/hr in adults)
VI. Commonly used meds for maintenance Rx for seizures:

<table>
<thead>
<tr>
<th>Drug (generic/trade name)</th>
<th>Loading dose mg/kg</th>
<th>Maintenance dose mg/kg</th>
<th>Therapeutic serum conc. (ml/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenytoin (Dilantin)</td>
<td>10 to 20</td>
<td>4 to 8</td>
<td>10 to 20</td>
</tr>
<tr>
<td>Phenobarbital (Luminal)</td>
<td>8 to 20</td>
<td>2 to 5</td>
<td>10 to 30</td>
</tr>
<tr>
<td>Primidone (Mysoline)</td>
<td>--</td>
<td>10 to 25</td>
<td>5 to 10</td>
</tr>
<tr>
<td>Carbamazepine (Tegretol)</td>
<td>--</td>
<td>10 to 20</td>
<td>5 to 10</td>
</tr>
<tr>
<td>Valproic acid (DepaKene)</td>
<td>--</td>
<td>15 to 30</td>
<td>55 to 100</td>
</tr>
<tr>
<td>Ethosuximide (Zarontin)</td>
<td>--</td>
<td>20 to 30</td>
<td>40 to 100</td>
</tr>
<tr>
<td>Clonazepam (Clonopin)</td>
<td>--</td>
<td>1 to 12 mg/day</td>
<td>0.005 to 0.05</td>
</tr>
</tbody>
</table>