Pulseless Electrical Activity

Scenarios:
1. A 36 year-old male collapses in the orthopedic clinic waiting room while waiting for his follow-up appointment 2 weeks after his Achilles tendon repair.
2. A 32 year-old male feels weak for several days and then collapses in the emergency room waiting area. He has missed his last 2-dialysis appointments.
3. A 68 year-old male with hypertension who is complaining of back pain collapses as he is pulled from the car by his family.
4. A 62 year-old female who complains of shortness of breath suddenly becomes unresponsive.

- Cause of PEA (the search for a reversible cause)
- Why is this patient in PEA at this time?
- Use heart rate and QRS shape as clues to the cause of PEA

<table>
<thead>
<tr>
<th>Cause</th>
<th>Hint</th>
<th>Rhythm Strip</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoxia</td>
<td>Cyanosis</td>
<td>Bradycardia</td>
<td>Airway, oxygen</td>
</tr>
<tr>
<td>Hypovolemia</td>
<td>Vomiting, bleeding, flat neck veins</td>
<td>Narrow complex Tachycardia</td>
<td>Fluids, Blood</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>Cold exposure</td>
<td>Osborne “J” waves, bradycardia</td>
<td>Bear hugger</td>
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<tr>
<td>H+ Ions (acidosis)</td>
<td>Dialysis, shunt</td>
<td>Low voltage</td>
<td>Sodium bicarbonate</td>
</tr>
<tr>
<td>Hyperkalemia/ Hypokalemia</td>
<td>Dialysis, shunt</td>
<td>Wide QRS</td>
<td>Calcium, Insulin, Glucose, kayexelate</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>Accucheck</td>
<td>Sinus bradycardia</td>
<td>Dextrose</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tamponade</th>
<th>Chest trauma, ESRD</th>
<th>Electrical alternans Low voltage</th>
<th>Pericardiocentesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tension Pneumothorax</td>
<td>Chest trauma</td>
<td>Low voltage, bradycardia from hypoxia</td>
<td>Needle thoracentesis, Chest Tube</td>
</tr>
<tr>
<td>Toxins</td>
<td>Pill bottles</td>
<td>Wide QRS (TCA)</td>
<td>Antidote if appropriate</td>
</tr>
<tr>
<td>Thrombosis (MI)</td>
<td></td>
<td>ST-segment elevation</td>
<td>Reperfusion therapy, Fluids</td>
</tr>
<tr>
<td>Thrombosis (PE)</td>
<td></td>
<td>Tachycardia, S1Q3T3</td>
<td>Thrombolytic therapy, fluids</td>
</tr>
</tbody>
</table>
PEA by rate and Complex Width

<table>
<thead>
<tr>
<th>Rate</th>
<th>Narrow Complex – likely non cardiac</th>
<th>Wide Complex – cardiac likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast &gt;60 beats/min</td>
<td>Sinus</td>
<td>VT</td>
</tr>
<tr>
<td></td>
<td>PSVT</td>
<td>VF</td>
</tr>
<tr>
<td>Slow</td>
<td></td>
<td>Hypothermia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hyperkalemia</td>
</tr>
</tbody>
</table>

General treatment of PEA (after treatment of the cause)
1. CPR (ABC)
2. Oxygen
3. epinephrine 1 mg every 3-5 minutes
4. atropine
5. Sodium Bicarbonate

Pitfalls
1. Failure to adequately assess the patient
2. Failure to consider other causes of PEA
3. Treat with epinephrine only
4. Not trouble-shooting oxygenation/ventilation
5. Failure to give fluids
6. Defibrillation
7. Not performing chest compressions

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**Asystole**
Silent Heart Algorithm

Scenarios:
1. A 36 year-old male is found by the police on a park bench. He is unconscious. Empty narcotic pill bottles are found in his belongings.
2. A 16 year-old male falls from the back of a pick-up truck striking his head on the pavement. You find him 10 minutes after the event, unconscious on the street.
3. A 68 year-old male with hypertension is found by his neighbors inside his house on a cold morning in late fall. His pet bird is also dead.
4. A 62 year-old female who complains of shortness of breath suddenly becomes unresponsive.

Asystole for 10 minutes with no potential reversible cause = death = stop resuscitation

Assessment
1. Verify asystole
a. Monitor on
b. Leads placed
c. Monitor gain up
d. Check another lead

2. ABCs
3. Ventilation at the primary buffer therapy
4. Reversible conditions for asystole = reversible conditions for PEA

Treatment
1. CPR
2. Oxygen
3. Definitive Airway
4. Transcutaneous Pacing
5. Epinephrine
6. Atropine
7. Sodium Bicarbonate (1 mEq/kg)
   a. Hyperkalemia
   b. TCA Overdose
   c. Alkalinization of Urine

Do not Start
1. well documented order
2. bracelet
3. obvious signs of death

Termination of ACLS efforts
1. Failure of effective CPR
2. VF eliminated
3. Airway adequate
4. IV established
5. Intervention maintained for 10 minutes
6. Appropriate drugs administered
7. Family informed