Phases of Cardiac Arrest

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Faculty Disclosures

Michael A. Jasumback does not have any conflicts of interest (commercial, financial, or scientific) now or within the last 12 months related to this topic.
Why do I Care?

It informs the sequence of events of a resuscitation

The phase of cardiac arrest determines the interventions most likely to result in successful resuscitation

It defines modern cardiac arrest management

Figure 2. Graphic Representation Of The 3-Phase Time Sensitive Model Of Cardiac Arrest

This model predicts 50% survival rate for defibrillation provided in the electrical phase where electrical phase = 0 to 4 minutes, circulatory phase = 4 to 10 minutes, and metabolic phase > 10 minutes (based on the model described by Weisfeldt and Becker. JAMA, 2002).
## Etiologies of Sudden Cardiac Death

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coronary Artery Disease</strong></td>
<td>Approximately 80%</td>
</tr>
<tr>
<td>Acute Coronary Syndrome</td>
<td></td>
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<tr>
<td>Chronic Myocardial Scar</td>
<td></td>
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<tr>
<td><strong>Cardiomyopathies</strong></td>
<td></td>
</tr>
<tr>
<td>Dilated Cardiomyopathies</td>
<td>Approximately 10% to 15%</td>
</tr>
<tr>
<td>Hypertrophic Cardiomyopathies</td>
<td></td>
</tr>
<tr>
<td><strong>Uncommon Causes</strong></td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>Valvular/Congenital Heart Disease</td>
<td></td>
</tr>
<tr>
<td>Myocarditis, Genetic Ion-Channel Abnormalities, etc.</td>
<td></td>
</tr>
</tbody>
</table>

The phases

Electrical

Circulatory

Metabolic
The Electrical Phase

0-4 Minutes

Defibrillation
Bystander CPR
Electrical Phase: The Sequence

Early Defibrillation

Bystander CPR (Hands Only)

What if they are gasping?

GOOD prognostic indicator
START or RECOMMEND STARTING CPR!
The Circulatory Phase

4-10 Minutes

CPR
Circulatory Phase: The Sequence

CPR

Defibrillation
Good CPR

- Minimize interruptions in CPR at all times
- Correct rate – 100/min
- Correct depth (at least 5cm)
- Ensure full chest recoil/decompression
- CPR for at least 2 min prior to defibrillation in unmonitored arrest
- CPR immediately post defibrillation, NO reassessment of ROSC
Why?
Why?

After pausing for ventilations, it takes about 10 compressions to ramp the CPP back up again.
Metabolic Phase

10 Minutes and Beyond

Oxygenation
Ventilation
?Meds
Metabolic Phase: The Sequence

- Oxygenation/Airway
- Ventilation/ NOT HYPERVENTILATION
- Medications
Oxygenation/Airway

Compared to BVM - No significant benefits from:

Endotracheal Intubation

Supraglottic Airway
Ventilation

- 10 BPM!
- Passive oxygenation?
- End Tidal
Medications

- Epinephrine
- Antiarrhythmics
- Bicarbonate
- Calcium
“As noted in the ACLS portion of the 2010 guidelines, CPR and defibrillation are the only therapies associated with improved survival in patients with VF/pVT.”