Pathophysiology Worksheet

Pathophysiology is a foundational (yet frequently underemphasized) part of EMT education. Whether understanding a patient presentation or reading a NREMT exam question, an understanding of pathophysiology is crucial.

This activity can be given out to groups or individuals for use in class or at home to get them into some of the main pathophysiological concepts.

It is vital that you facilitate conversation and demonstrate the importance of the material. Do you have an interesting case that may highlight some of the points below?

1. Define the following terms. Use your book for reference if you have to.

Stroke volume

Amount of blood pumped from the heart (left ventricle)

Cardiac output

Heart rate x stroke volume

Vascular resistance

The amount of contraction of the blood vessels. In discussion relate how cardiac output and vascular resistance = blood pressure.

Shock

Inadequate perfusion to the tissues; note how this is different than hypotension.

Compensation

The body's attempts to maintain perfusion. This is the point to discuss how the components of heart rate, stroke volume and vascular resistance are used to maintain blood pressure.

Decompensation

Failure of the compensation mechanisms described above.
Pathophysiology Worksheet (cont’d)

2. List one example of each of the following types of shock with a two or three sentence description of how/why it happens. (Example: Hypovolemic is low volume. It can be caused by excessive diarrhea in a newborn. The liquid is lost through the GI tract and expelled as diarrhea).

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovolemic</td>
<td>External and internal bleeding are most commonly thought of. Burns may be another example of fluid shift without external hemorrhage.</td>
</tr>
<tr>
<td>Distributive</td>
<td>Anaphylaxis or sepsis</td>
</tr>
<tr>
<td>Obstructive</td>
<td>Tension pneumothorax</td>
</tr>
<tr>
<td>Cardiogenic</td>
<td>Myocardial infarction</td>
</tr>
</tbody>
</table>
Pathophysiology Worksheet (cont’d)

3. You are treating a patient in shock. Explain the physiologic/pathophysiologic reason you see each of the following signs and symptoms. The answers do not have to be long but must adequately and accurately describe the mechanism that causes each sign to appear.

<table>
<thead>
<tr>
<th>Sign/Subclinical Finding</th>
<th>Measured Pathophysiologic Mechanism/Explaination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altered level of responsiveness</td>
<td>Decreased levels of fuel (oxygen and glucose) to the brain</td>
</tr>
<tr>
<td>Moist skin</td>
<td>Blood shunted from the skin to vital organs</td>
</tr>
<tr>
<td>Rapid pulse</td>
<td>Increased pulse = increased cardiac output in an attempt to raise BP</td>
</tr>
<tr>
<td>Rapid respirations</td>
<td>Keeping blood oxygenated</td>
</tr>
<tr>
<td>Pale skin</td>
<td>Blood shunted from the skin to vital organs</td>
</tr>
<tr>
<td>Decreased blood pressure</td>
<td>Decompensation</td>
</tr>
<tr>
<td>Narrowed pulse pressure</td>
<td>Cardiac output drops (reduces systolic pressure) and vascular resistance increases (increasing diastolic pressure) resulting in a narrowed pulse pressure.</td>
</tr>
</tbody>
</table>
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1. Define the following terms. Use your book for reference if you have to.

   Stroke volume

   Cardiac output

   Vascular resistance

   Shock

   Compensation

   Decompensation

2. List one example of each of the following types of shock with a two or three sentence description of how/why it happens. (Example: Hypovolemic is low volume. It can be caused by excessive diarrhea in a newborn. The liquid is lost through the GI tract and expelled as diarrhea).

   Hypovolemic

   Distributive

   Obstructive

   Cardiogenic
Pathophysiology Worksheet (cont’d)

3. You are treating a patient in shock. Explain the physiologic/pathophysiologic reason you see each of the following signs and symptoms. The answers do not have to be long but must adequately and accurately describe the mechanism that causes each sign to appear.

- Pale skin
- Moist skin
- Rapid pulse
- Rapid respirations
- Altered level of responsiveness
- Decreased blood pressure
- Narrowed pulse pressure