

- ### Cardiogenic Shock
- Want to save lives-
Assess, think and act
 - Break it down so it is simple
 - Understand not memorize (Krebs Cycle)
 - Make it applicable to actual patient care

- ### Cardiogenic Shock
- What is "Shock"?
 - Beware of Bears!
 - Capillary Pressures and Fluid Shifts
 - Compensation Process
 - Decompensation
 - Cardiogenic Shock

Shock

is defined as a syndrome initiated by acute hypoperfusion, leading to tissue hypoxia and vital organ dysfunction

- ### Named by it's Cause
- Anaphylactic
 - Exaggerated systemic allergic response to a substance
 - Hypovolemic
 - critical reduction in intravascular volume
 - Neurogenic
 - Damage/dysfunction of sympathetic nervous system (brain stem/spinal cord injury T6 or above)
 - Septic
 - Systemic response to an infection (bacteria/toxins)
 - Cardiogenic
 - Heart pumping inadequate

Circulatory System

•**Goal:** To provide adequate perfusion to cells in order to deliver Oxygen and Nutrients and to Remove Waste Products

Circulatory System

This is dependant on 3 factors:

1. Heart = Pump
2. Vessels = Pipes
3. Blood = Volume

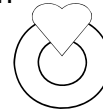


To meet the goal: If one of these decreases, one or both of the others must increase.

Circulatory System

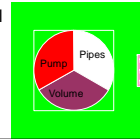
This is dependant on 3 factors:

1. Heart = Pump Harder/Faster
2. Vessels = Pipes Constrict
(more vascular tone)
3. Blood = Volume Hold onto urine

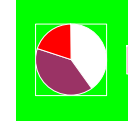
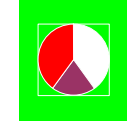
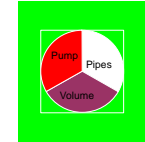


Pull fluid from interstitial space
Give fluids

This is COMPENSATION.



Treat the cause,
then help fill the
Perfusion Pie



Septic

Hypovolemic

Cardiogenic

Stages of Shock

- Compensated = Normotensive
- Decompensated = Hypotensive
- Irreversible

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Primitive Reflexes

Autonomic Nervous System Bear Vs. Pear



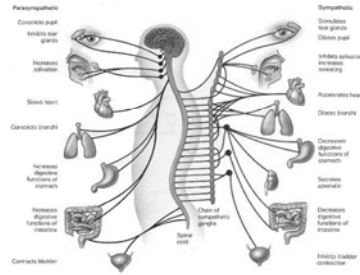
Fight or Flight

Feed or Breed



The Autonomic Nervous System

The parasympathetic nervous system, which regulates day-to-day internal processes and behavior, is shown on the left. The sympathetic nervous system, which regulates internal processes and behavior in stressful situations, is shown on the right. Note that, on their way to and from the spinal cord, the nerve fibers of the sympathetic nervous system innervate, or make connections with, ganglia, specialized clusters of nervous tissue.



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Capillary Pressure

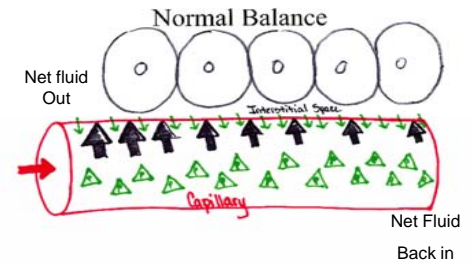


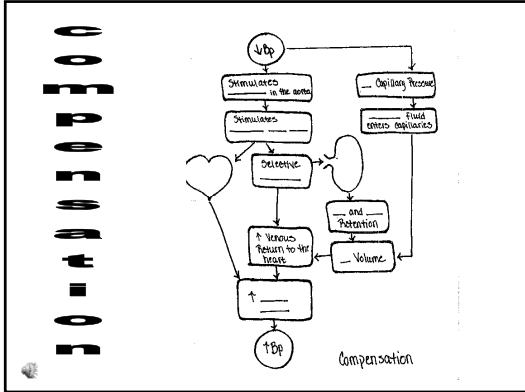
Colloid Osmotic Pressure

Capillary Pressure



Colloid Osmotic Pressure





What did they have in common?

Over 100 patients

Charts reviewed looking at the 8-12 hrs pre-arrest

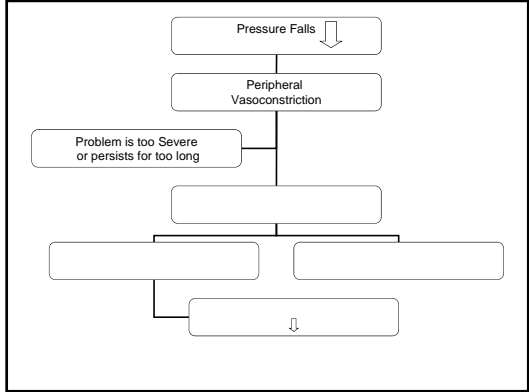
All had one thing

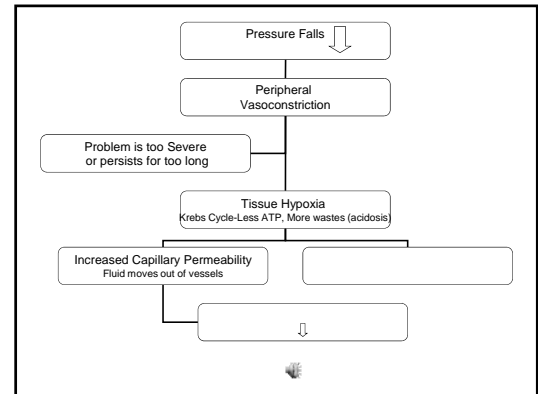
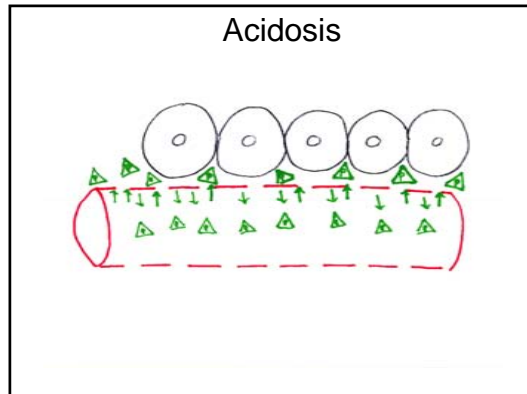
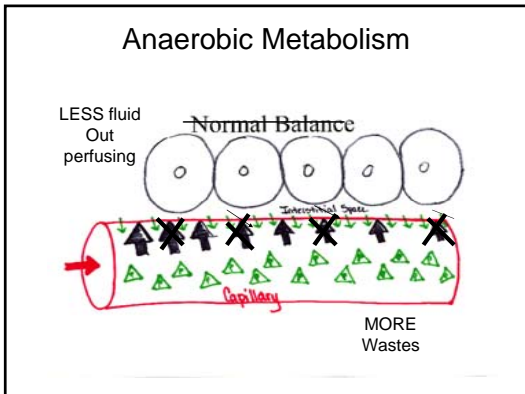
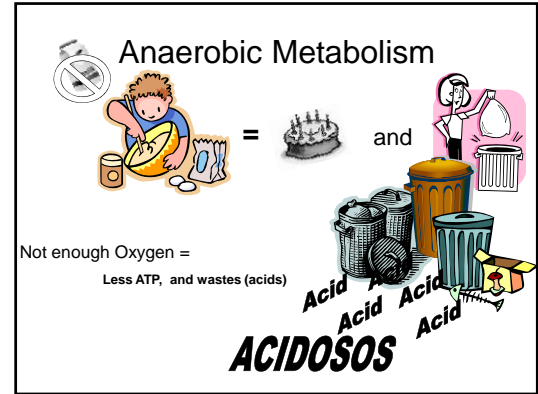
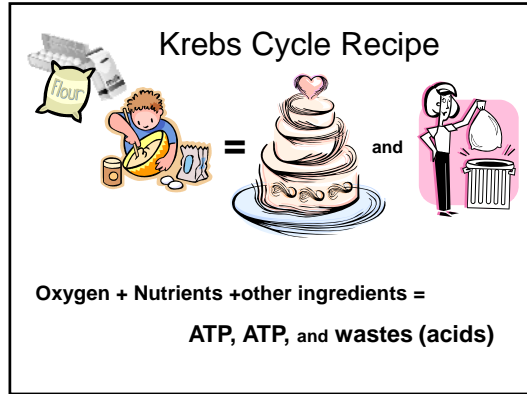
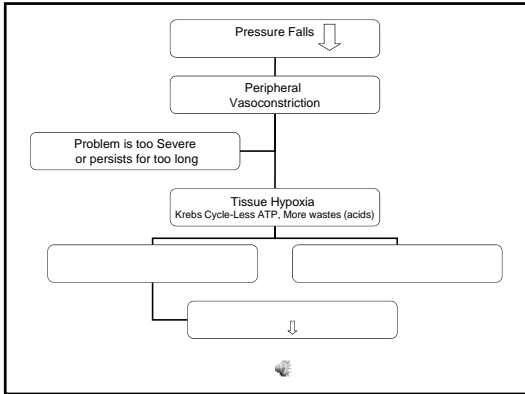
Someone Charted it

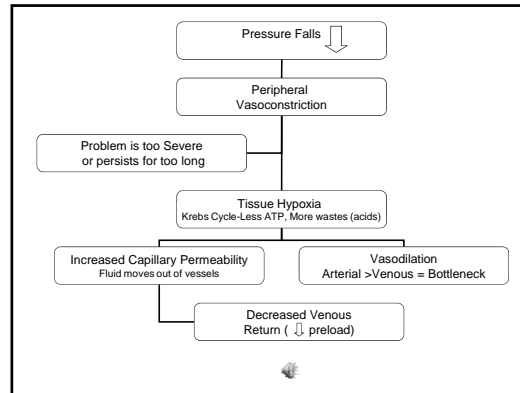
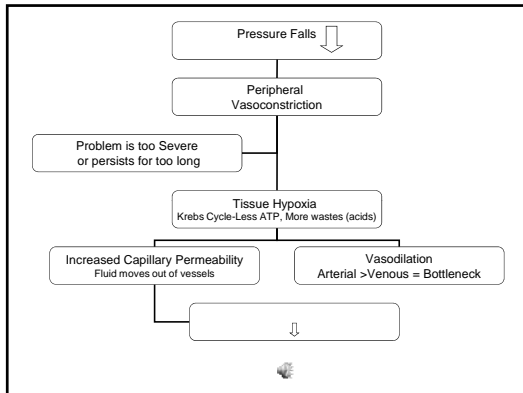


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What if you don't hear the Bear coming?







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Cardiogenic Shock Causes

- **Myocardial Infarction is the most common cause of Cardiogenic Shock** (anterior MI)

Other Causes

- Catastrophic valve problems
- Infections
- Structural rupture (LV, septum, etc.)
- Pulmonary Embolus- Massive PE
- Intracardiac clott
- Tamponade
- Acidemia/electrolyte imbalance

Clinical definition of cardiogenic shock
decreased cardiac output and evidence of tissue hypoxia in the presence of adequate intravascular volume.

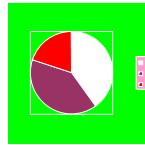
Hemodynamic criteria for cardiogenic shock are:

- sustained hypotension
(systolic blood pressure <90 mm Hg for at least 30 min)
- reduced cardiac index (<2.2 L/min/m²)
- in the presence of elevated pulmonary capillary occlusion pressure (>15 mm Hg).

It's a pump problem!

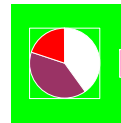
Cardiogenic Shock

- First Treat the cause:
- Then help fill the Pie:

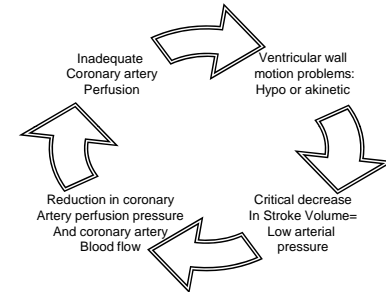


Cardiogenic Shock

- **First Treat the cause:**
 - MI
 - Reperfusion with PTCA, Stent, CABG, Thrombolytics
 - Mortality rate from 80% , now down to 50-60%
 - Keep Oxygenation high/ Oxygen consumption low
- **Then help fill the Pie:**
(some interventions help more than one piece)
 - Volume Balance
 - Starlings law
 - Help the pump
 - Inotropes
 - IABP
 - LVAD



Cardiogenic Shock-Vicious Cycle



Signs/Symptoms

- Clinical signs of poor tissue perfusion:**
 oliguria
 cool extremities, <capillary refill, cyanosis
 altered mentation ("he's acting funny")
 restlessness
- Left Ventricular Failure**
 Cough, frothy sputum
 Short of Breath
 Restless
 Doesn't want to lie flat
 Crackles
 Change in heart sounds
 Arrhythmias



Beware of BEARS!

References

Darovic, G. (2004). *Handbook of Hemodynamic Monitoring* (2nd Ed.). Elsevier Saunders: St. Louis, MO.

Mattu, A. (2008). *Post-Myocardial Infarction Cardiogenic Shock: What's New?* Retrieved August 5, 2009 from <http://www.medscape.com>

O'Neal, P.V. (1994). *How to Spot Early Signs of Cardiogenic Shock*. American Journal of Nursing, Retrieved August 5, 2009 from <http://journals.lww.com/ajnonline/pages>

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