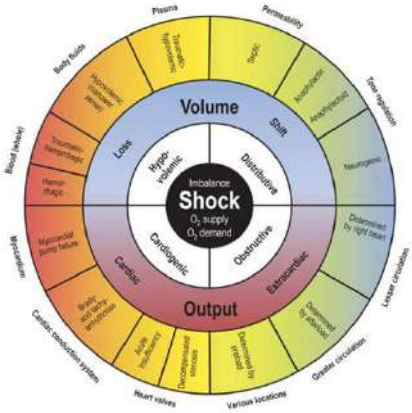




SHOCK (HYPOPERFUSION)

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Hello and thank you Missah. So, I am glad to be back and am ready to discuss shock with you. Shock or Hypoperfusion, is about supply and demand. Cells need oxygen and nutrients. In shock, there is more demand than supply. And remember, shock may result from many types of conditions; medical and traumatic alike.

The diagram to my left, introduces the four shock types. Which you can find in the white center quadrants. You can see the sub-types located in the outer ring.

So, again; Shock occurs when cells lack the oxygen they need for metabolism. Remember that Perfusion is the Regular delivery of oxygen and nutrients to the cells, along with the removal of waste products. Hypoperfusion is the inadequate delivery of vital oxygen and nutrients. Which, if left unchecked will result in organ system failure and death.

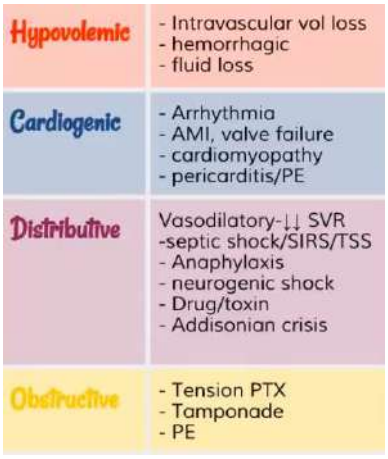
Early recognition of shock is essential. Be aware that blood pressure is an easy-to-measure shock indicator.

Good Studying.

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SHOCK (HYPOPERFUSION)

- Inadequate tissue perfusion
- It also causes inadequate removal of waste products from cells



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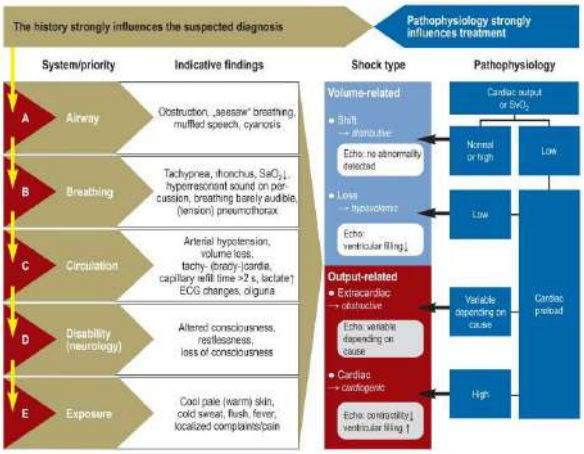
As we learned, shock means Inadequate tissue perfusion. It also causes inadequate removal of waste products from the cells.
There are four types of shock:

- First: Hypovolemic Shock, which is Decreased intravascular fluid volume. Often evidenced by flat neck veins, tachycardia, and pallor.
- Second is Distributive shock, this refers to Increased vascular “pipe” size; peripheral vasodilation and vascular permeability. Also evidenced by flat neck veins, tachycardia, and pallor.
- Cardiogenic shock refers to the Primary heart “pump” failure. Symptoms include Jugular venous distension or JVD, tachycardia, and cyanosis.
- And Obstructive shock refers to blood Vessels that are obstructed. And has the Same symptoms as Cardiogenic shock.

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CAUSES OF SHOCK

- Failure of any component of the circulatory system
- Heart
  - ✓ Loses ability to pump
- Blood vessels
  - ✓ Dilate, making too large a "container" to fill
- Blood
  - ✓ Loses volume from bleeding



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Causes for hypoperfusion include low blood pressure, heart failure or loss of blood volume. Ischemia can affect any organ of the body. Intermittent ischemia of the heart muscle is called angina. Intermittent ischemia of the brain is called a Transient Ischemic Attack (TIA) or "mini-stroke".

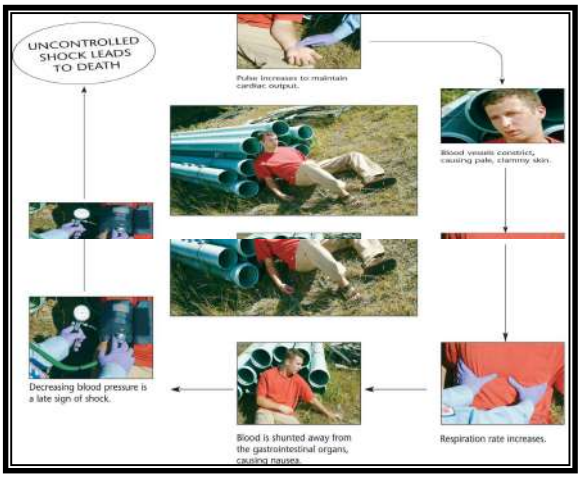
Shock will result from the Failure of any component of the circulatory system. The Heart may lose its ability to pump. Blood vessels Dilate, making too large a "container" to fill. Or Blood volume decreases due to hemorrhage.

Occasionally shock may develop even when cardiac output is adequate. This can happen when the cell metabolic demand is so excessive that the body cannot increase perfusion enough to make the supply of oxygen and nutrients meet demand. This is common in patients with fever, infection, respiratory distress, and extreme pain.

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CAUSES OF SHOCK (CONT.)

- Signs of shock will be detectable during the patient assessment



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This diagram shows a progression of how the body compensates to minimize or overcome the mismatch in supply and demand of oxygen and nutrients. The diagram presents these 5 steps:

1. Pulse increases to maintain cardiac output.
2. Blood vessels constrict, causing pale, clammy skin.
3. Respiration rate increases.
4. Blood is shunted away from the gastrointestinal organs, causing nausea.
5. Decreasing blood pressure is a late sign of shock.

Signs of shock will be detectable during the patient assessment.

Now think about:

- What are the long-term effects of compensation?
- Why does it eventually lead to decompensation, and
- Are there lasting effects?

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SEVERITY OF SHOCK

- Compensated shock
  - ✓ Body senses the decrease in perfusion and attempts to compensate for it
  - ✓ Early signs of shock
- Decompensated shock
  - ✓ Begins when the body can no longer compensate for low blood volume or lack of perfusion
  - ✓ Late signs of shock

Compensated shock	Decompensated shock	Irreversible shock
• Pulse rate increases • Respirations increase • Weak pulse • Cool, clammy skin • Anxious, restless, combative • Thirsty, weak	• Very weak or absent pulses • Severe drop in blood pressure • Altered mental status or unconsciousness • Slow breathing to apnea	• Cell death • Organ system failure • Washout • Hemorrhaging all over • Patient dies
Stage I and II hemorrhages 500-1250ml blood loss 5-25% blood volume lost	**Stage III and IV hemorrhages** 1250-1750+ ml blood loss 25-35%+ blood volume lost	**Stage IV hemorrhage** 1750+ ml blood loss 35%+ blood volume lost
THIS IS WHERE YOU NEED TO WORK YOUR MAGIC. Stop the bleeding. Oxygenation. Give fluids. Keep the patient warm. Get them the hell out of there.	You MAY be able to get the patient back, but you need to work very fast.	Fatal

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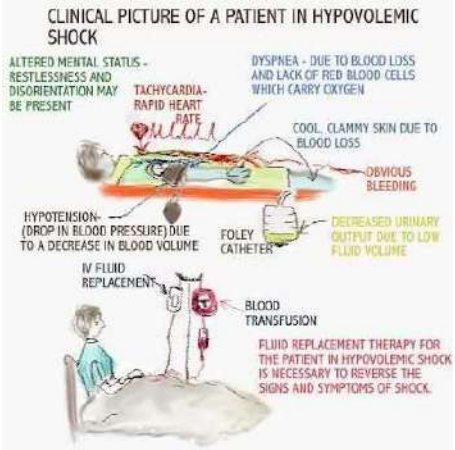
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The chart shows an ER Doctor's guide to shock. The EMT can have the most effect by keeping the patient in the green compensated shock zone.
Compensated shock is when the Body senses the decrease in perfusion and attempts to compensate for it. The Patient is still interacting normally and has a normal BP.
Decompensated shock Begins when the body can no longer compensate for low blood volume or lack of perfusion. Late signs of shock lead to irreversible shock, and it's too late.
So let's review compensated shock systems now in a more clinical detail. Intervene early and aggressively to prevent worsening shock.

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TYPES OF SHOCK

- Hypovolemic shock
- Results from a decreased volume of circulating blood and plasma
- Called hemorrhagic shock if caused by uncontrolled bleeding (internal or external)
- Can be caused by burns or crush injuries or severe dehydration



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Hypovolemic shock results from a decreased volume of circulating blood and plasma. It is also Called hemorrhagic shock if caused by uncontrolled internal or external bleeding. It Can also be caused by burns or crush injuries or severe dehydration. Hypovolemic shock is a medical emergency and an advanced form of hypovolemia due to insufficient amounts of blood inside the human body. Hypovolemic shock occurs when there is a decreased intravascular volume to the point of cardiovascular compromise.

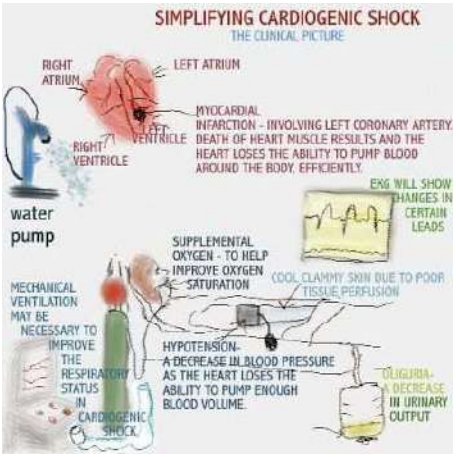
People with hypovolemic shock have severe hypovolemia with decreased peripheral perfusion. If left untreated, these patients can develop ischemic injury of vital organs, leading to multi-system organ failure.

Trauma is the most common cause of hemorrhagic shock, but causes can span multiple systems. Tachycardia is typically the first abnormal vital sign of hemorrhagic shock. As the body attempts to preserve oxygen delivery to the brain and heart, blood is shunted away from extremities and nonvital organs. This causes cold and mottled extremities with delayed capillary refill.

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TYPES OF SHOCK (CONT.)

- Cardiogenic shock
- Seen in patients suffering myocardial infarction
- Results from inadequate pumping of blood by heart, decreasing strength of contractions
- Heart's electrical system may malfunction, causing heartbeat that is too slow, too fast, or irregular



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Cardiogenic shock is a condition where the heart suddenly can't pump enough blood to meet the body's needs. The condition is most often caused by a severe heart attack, but not everyone who has a heart attack has cardiogenic shock. Cardiogenic shock refers to the Primary heart “pump” failure. Symptoms include Jugular venous distension or JVD, tachycardia, and cyanosis.

It results from inadequate pumping of blood by the heart, decreasing strength of contractions. Also, the Heart's electrical system may malfunction, causing a heartbeat that is too slow, too fast, or irregular.

Cardiogenic shock is rare, but it's often fatal if not treated immediately. If treated immediately, about half the people who develop the condition survive.

Because cardiogenic shock usually occurs in people who are having a severe heart attack, it's important to know the signs and symptoms of a heart attack. These include:

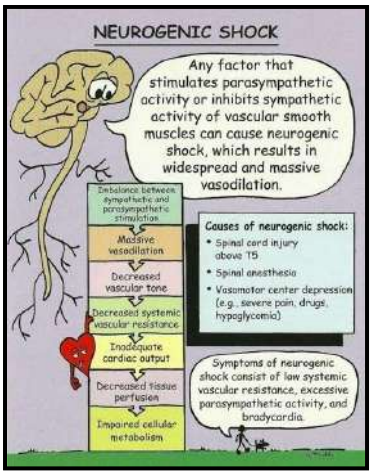
- Pressure, fullness or a squeezing pain in the center of the chest that lasts for more than a few minutes
- Pain extending to the shoulder, one or both arms, back, or even to teeth and jaw
- Increasing episodes of chest pain
- Shortness of breath
- Sweating

- Lightheadedness or sudden dizziness, and
- Nausea and vomiting

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TYPES OF SHOCK (CONT.)

- Neurogenic shock
- Type of Distributive Shock
- Results from uncontrolled dilation of blood vessels because of nerve paralysis
- No blood loss, but vessels dilated so much that blood volume cannot fill them
- Rarely seen in the field



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Neurogenic shock is a distributive type of shock resulting in low blood pressure, occasionally with a slowed heart rate, which is attributed to the disruption of the autonomic pathways within the spinal cord. It can occur after damage to the central nervous system, such as spinal cord injury and traumatic brain injury.
It results from uncontrolled dilation of blood vessels because of nerve paralysis.
There is no blood loss, but vessels dilate so much that blood volume cannot fill them.

Pediatric Note

- Infants and children
- Efficient compensating mechanisms maintain blood pressure until half of volume is depleted
- Potential for shock must be recognized and treated before tell-tale signs appear



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Children have very efficient compensating mechanisms to maintain their blood pressure. That is until half of the blood volume is depleted. As a result, the potential for shock in children must be recognized and treated before tell-tale signs appear. Some general pediatric shock symptoms to look for include: Lethargy, weakness, a sense of malaise, decreased urine output, fussiness, and poor feeding are all nonspecific symptoms that may accompany pediatric shock.

The most common cause of shock in children is sepsis, followed by hypovolemic shock, distributive shock, and then cardiogenic shock.

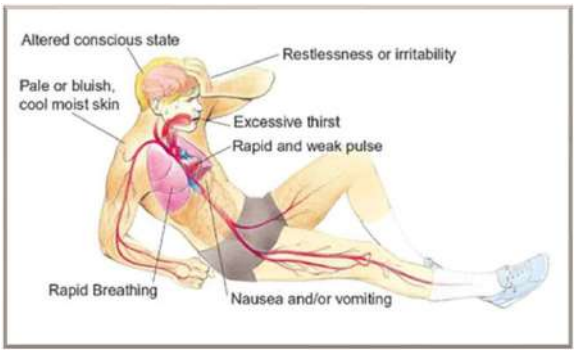
- If you suspect the child is in compensated shock, after standard ABCs,
- Lay the Person Down, if Possible. Elevate the person's feet about 12 inches. That is unless you suspect the head, neck, or back is injured or you suspect broken hip or leg bones.
- Treat Obvious Injuries.
- Keep the child Warm and Comfortable.
- Be prepared to quickly Transport.

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PATIENT ASSESSMENT

Progression of the signs and symptoms of shock

- Altered mental status
- Pale, cool, clammy skin
- Nausea and vomiting
- Vital sign changes
- Late signs of shock include thirst, dilated pupils, and sometimes cyanosis around lips and nail beds



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Progression of the signs and symptoms of shock include

- Altered mental status
- Pale, cool, clammy skin
- Nausea and vomiting
- Vital sign changes

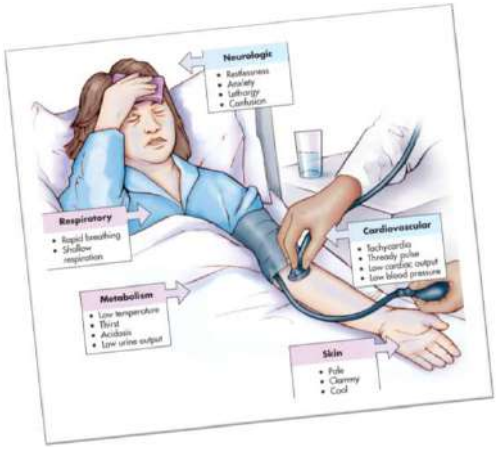
Late signs of shock include thirst, dilated pupils, and sometimes cyanosis around lips and nail beds.

Think about, what steps the body might take to compensate for shock. How will the body save itself? Discuss on the forum or with your instructor on a scheduled video chat session.

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EMERGENCY CARE FOR SHOCK

- Every minute between the time of injury and the patient's getting to an operating suite is, in fact, like gold to the patient — and to their chances of survival
- Goal is platinum 10 minutes at the scene
- Prevent heat loss, coagulopathy, and further blood loss



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Transportation is an intervention. For a patient in compensated shock, every minute between the time of injury and the patient's getting to an operating suite is like gold to the patient—and to the chances of survival.
Your Goal is a platinum 10 minutes at the scene. Be sure to prevent heat loss, coagulopathy, and further blood loss.

Patient Care

- Maintain open airway and assess the respiratory rate
- Address inadequate breathing immediately and aggressively
- If patient is breathing adequately, apply high-concentration oxygen by nonrebreather mask

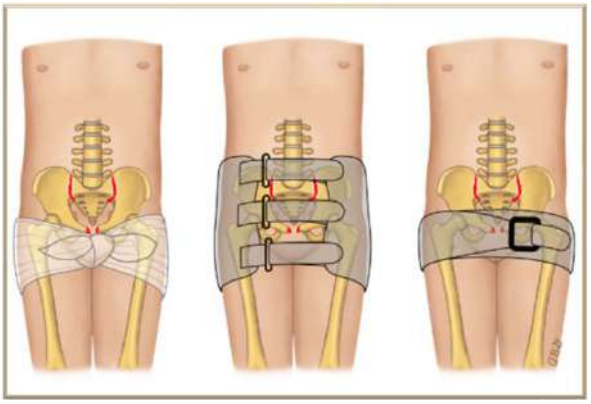


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Maintain an open airway and assess the patient's respiratory rate. Address inadequate breathing immediately and aggressively. If the patient is breathing adequately, apply high-concentration oxygen by a nonrebreather mask.

Patient Care (Cont.)

- Control any external bleeding
- If pelvic fracture is suspected, use pelvic binding device



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As always, follow your ABC protocol. Control any external bleeding. If a pelvic fracture is suspected, use a pelvic binding device.

A pelvic binder is a device used to compress the pelvis in those with a pelvic fracture in an effort to stop bleeding. They are specifically recommended for open book pelvic fractures, and might not be useful in those with lateral compression fractures.

The pelvic binder is placed by the trauma team on patients who have suspected or documented pelvic injuries, potentially associated with major hemorrhage. The decision for the initial placement of the pelvic binder may be made by ALS or Medical Support. Patients with mechanically unstable fractures are the most likely to benefit from pelvic binding.

Patient Care (Cont.)

- Splint any suspected bone or joint injuries
- Prevent loss of body heat
- Transport patient immediately
- Speak calmly and reassure throughout assessment and care



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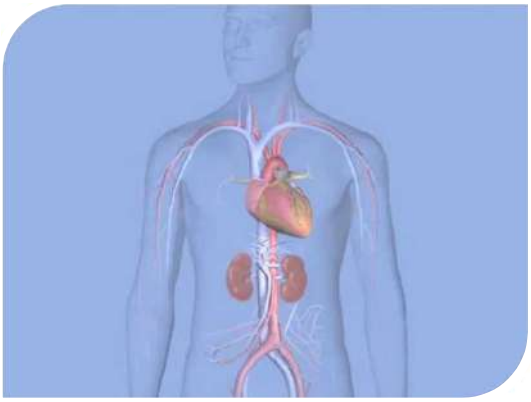
Care for a shock patient should include the following:

- Splint any suspected bone or joint injuries.
- Prevent loss of body heat.
- Transport patient immediately.
- Speak calmly and reassure throughout the assessment and care.

Think about: What can be done to assist compensation and prevent decompensation in a shock patient? You can discuss on the forum or with your instructor in a scheduled video chat session.

Shock Animation Video

- What are some of the most common causes of shock?
- Discuss the role of the EMT in the assessment and management of a patient in shock
- What types of shock usually result from blood vessel dilation?



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Now view an animated video about Shock. While watching, think about:

- What are some of the most common causes of shock?
- Discuss the role of the EMT in the assessment and management of a patient in shock.
- What types of shock usually result from blood vessel dilation?

So, this is the end of Lesson 3 about Shock. Missah will join you next for a review on this entire topic of Bleeding and Shock after the video.

Thanks for listening and Good Studying.