



**Know** who is at risk

**Know** the three phases of sepsis

**Know** the diagnostic tools

**Know** their treatments.



### **Nurses Educational Opportunities**

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## Sepsis Awareness

CDC recognizes September as Sepsis Awareness Month and is working year round to raise awareness of sepsis, prevent it, and improve early detection and treatment.

Sepsis is a life-threatening condition which the body is fighting a severe infection that is spread via the bloodstream.

- ♥ If the patient becomes “septic,” they will likely have low blood pressure leading to poor circulation and the lack of blood perfusion of vital tissues and organs.
- ♥ This condition is termed “shock and is sometimes referred to as septic shock when an infection is the cause of the shock to distinguish it from shock due to blood loss of from other causes.
- ♥ This condition can develop either as a result of the body’s own defense system or from toxic substances made by an infecting agent.

People at risk for shock include:

- ♥ People whose immune systems are not functioning well because of an illness such as diabetes or AIDS.

- ♥ People who have had medical treatments that have weakened the immune system such as chemotherapy, cancer, or steroids.
- ♥ It is important to remember that even healthy people can become septic.
- ♥ Very young babies, because their immune systems are not completely developed, make it sepsis if they become infected and not treated in a timely manner.
- ♥ The elderly population, especially those with other medical illnesses, may be at increased risk.
- ♥ Hospitalized patients are at risk to develop sepsis from infections due to intravenous lines, catheters, and surgical wounds.

The number of people dying from sepsis has increased in the past 20 years.

- ♥ This is most likely due to the increased number of patients who suffer from sepsis.
- ♥ Increased antibiotic use as resulted in many more resistant strains of bacteria, making the treatment for sepsis more difficult in some cases because there is no effective antibiotic.
- ♥ There has been a large increase in sepsis because doctors have started treating cancer patients and organ- transplant patients with strong medications that we can the immune system.

Many different microbes can cause sepsis.

- ♥ Although bacteria are most commonly the cause, viruses and fungi can also cause sepsis.
- ♥ Infections such as pneumonia, urinary tract infections, cellulitis, appendicitis, and meningitis can spread and lead to sepsis.
- ♥ Infections that develop after surgery can also lead to sepsis.

The signs and symptoms of sepsis include:

- ♥ Persons often will have fever but sometimes the body temperature may be normal or even low.
- ♥ The person may have chills and severe shaking.
- ♥ The person may have tachypnea and tachycardia.
- ♥ The person will often have low blood pressure.
- ♥ The person may be confused, disoriented, and agitated as well as being dizzy.
- ♥ The person will have decreased urinary output due to poor kidney perfusion.
- ♥ The person may have a rash of petechiae or purpura throughout the body.
- ♥ The person may complain of pain in the joints of the wrist, elbows, back, hips, knees,



and ankles.

The signs and symptoms of **early sepsis** include:

- ♥ Warm extremities
- ♥ Warm skin
- ♥ Normal cap refill
- ♥ Tachycardia

The signs and symptoms of **late sepsis** include:

- ♥ Cool extremities
- ♥ Cool skin
- ♥ Reduced cap refill
- ♥ Tachycardia

Rapid diagnosis is essential for survival.

- ♥ To be completed within three hours of admission:
  - Obtain a serum lactate level.
  - Obtain blood culture prior to administration of antibiotics.
  - Administer broad-spectrum antibiotics.
  - Administer 30 mL/kg of a crystalloid isotonic solution intravenously for hypotension or lactate  $\geq$  4 mmol/dl.
- ♥ To be completed within six hours of admission:
  - Administer vasopressors when hypotension does not respond to fluid

resuscitation to maintain a mean arterial pressure of  $\geq 65$  mmHg.

- If persistent arterial hypertension continues in spite of volume resuscitation or lactate, obtain a central venous pressure and central venous oxygen saturation (Scvo2).
  - CVP should be  $\geq 8$ mmHg
  - Scvo2 should be  $\geq 70\%$
- Re-measure lactic level if initial lactate was elevated.

♥ Additional diagnostic test include:

- Cultures of sputum, urine, spinal fluid, and/or abscesses.
  - Urine specimens must be collected by sterile technique of a urinary catheter.
- Chest x-ray to rule out pneumonia
- CT scan to rule out infection in the abdomen
- CBC to determine WBC to be  $>12,000$  or  $<4,000$
- CBC to determine Immature bands of  $>10\%$

Treatment of sepsis include:

- ♥ Supplemental oxygen
- ♥ Antibiotic administration given intravenously

♥ Fluids and vasopressors to support blood pressure and prevent organ damage.

The prognosis of sepsis depends on;

♥ Age

- The elderly patient with many illnesses and whose immune system is not working well the death rate may be as high as 80%.

♥ Previous health history

♥ Overall health status

- Healthy people with no prior illness, the death rate may be as low as 5%

♥ How quickly the diagnosis is made

- The overall death rate from sepsis is approximately 40%
- It is important to remember that the prognosis also depends on any delay in diagnosis and treatment.
- The earlier the treatment is started the better the outcome will be.

♥ The type of organism causing the sepsis.

Sepsis is a three stage syndrome.

♥ Sepsis

- To be diagnosed with sepsis you must have at least two of the following symptoms plus a probable or confirmed infection.

- Body temperature above 101F ( 38.3 C) or below 96.8F ( 36 C)
- Heart rate higher than 90 bpm
- Respiratory rate higher than 20 breaths a minute

#### ♥ Severe sepsis

- The patient exhibits at least one of the following signs and symptoms, which indicate an organ may be failing.
  - Significant decrease in urinary output
  - Abrupt changes in mental status
  - Decrease in platelet count
  - Difficulty breathing
  - Abnormal heart pumping function
  - Abdominal pain



#### ♥ Septic shock

- The patient has signs and symptoms of severe shock plus extremely low blood pressure that doesn't adequately respond to simple fluid replacement.

#### ♥ The Septic Cascade

- The outer membrane of a gram-negative organisms becomes active.
- Mediators (Cytokines) are signaled.
- Cytokines damage the endothelial lining which leads to increase capillary leakage.
- Neutrophils respond to Cytokines
- Neutrophils and cytokines release nitric oxide.
- Nitric oxide is a potent vasodilator.
- Vasodilation decreases tissue perfusion to all vital organs.
- But that's not all that goes wrong.
- Cytokines release a substance called "tissue factor."
- "Tissue factor" leads to production of thrombin.
- Thrombin results in fibrin clots in the microvasculature which explains the purpura and petechia seen on the skin.
- Fibrinolysis is also impaired by the production of plasminogen activator inhibitor (a potent inhibitor of fibrinolysis).
- Now we have a bleeding situation.

- Antithrombin is then activated to inhibit thrombin production.
- Now we have a clotting situation.
- As a result of this vicious cycle
  - Of inflammation and coagulation/fibrinolysis
  - Cardiovascular insufficiency and multiple organ failure
  - Death often occurs

## Nurses Educational Opportunities

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