



Microbiology Blood & Lymphatic System

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10 Credits Hours



Curriculum

Septicemia, sepsis, brucellosis

Bacterial zoonosis (Anthrax, Plague, Pasteurella, Tularemia, leptospirosis, Lyme diseases)

Rickettsia diseases

HSV 1 & 2, VZV, EBV, CMV, Roseola infantum, HHV7, Kaposi sarcoma

Yellow fever, Dengue fever, Ebola, Leishmania, Trypanosoma

Bacteremia
Septicemia
sepsis

Differences between bacteremia & septicemia

Bacteremia

Is the simple presence of bacteria in the blood.

Is not as dangerous as Septicemia.

Less amount of bacteria are present in blood.

This may occur through a wound or infection, or through a surgical procedure or injection.

Toxins are not produced.

Bacteremia usually causes no symptoms or it may produce mild fever.

Septicemia

Is the presence & multiplication of bacteria in the blood.

Is a potentially life-threatening infection.

Large amounts of bacteria are present in the blood.

It can arise from infections throughout the body, including infections in the lungs, abdomen, & urinary tract.

Toxins may be produced by bacteria.

It shows symptoms like chills, fever, prostration, very fast respiration &/or

Differences between bacteremia & septicemia

Bacteremia

It can resolve without treatment.

Rapidly removed from the bloodstream by the immune system.

Caused by Staphylococcus, Streptococcus, Pseudomonas, Haemophilus, E. coli, dental procedures, UTI, peritonitis, Clostridium difficile colitis, IV drug use, & colorectal cancer.

Septicemia

Untreated septicemia can quickly progress to sepsis.

Antibiotics will be used to treat the bacterial infection th

Staphylococci, are thought to cause more than 50% of cases of sepsis. Other commonly implicated bacteria include Streptococcus pyogenes, E. coli, Pseudomonas aeruginosa, & Klebsiella species

Sepsis

Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection.

If not recognized early & managed promptly, it can lead to septic shock, multiple organ failure & death.

It is most frequently a serious complication of infection, particularly in low- & middle-income countries where it represents a major cause of maternal, neonatal morbidity & mortality.

Sepsis: Who is at risk?

Anyone affected by an infection, severe injury, or serious NCD can progress to sepsis but vulnerable populations are at higher risk including:

- older persons
- pregnant
- neonates
- hospitalized patients
- patients in ICU
- people with HIV/AIDS
- patient with liver cirrhosis
- patient with cancer,
- patient with kidney disease,
- patient with autoimmune diseases,
- people with no spleen.

Sepsis: Signs & symptoms

Sepsis is a medical emergency & can present with various signs & symptoms at different times. Warning signs & symptoms include:

- fever or low temperature & shivering
- altered mental status
- difficulty breathing/rapid breathing
- increased heart rate
- weak pulse/low blood pressure
- low urine output
- cyanotic or mottled skin
- cold extremities
- extreme body pain or discomfort

Initial investigations

CBC, chemistries, LFTs, & coagulation studies including D-dimer level. Results from these studies may support the diagnosis, indicate the severity of sepsis, & provide a baseline to follow the therapeutic response.

Serum lactate – An elevated serum lactate (eg, >2 mmol/L or greater than the laboratory upper limit of normal) may indicate the severity of sepsis & is used to follow the therapeutic response

Peripheral blood cultures (aerobic & anaerobic cultures from at least two different sites)

Initial investigations

Microbiologic cultures from suspected sources (eg, sputum, urine, IV catheter, wound or surgical site, body fluids) from readily accessible sites

Drawing blood for cultures through an indwelling or central IV catheter should be avoided whenever possible, since ports are frequently colonized with skin flora, thereby increasing the likelihood of false-positive blood culture.

Urine analysis

Initial investigations

Arterial blood gas (ABGs) may reveal acidosis, hypoxemia, or hypercapnia.

Imaging targeted at the suspected site of infection is warranted (eg, chest radiography, CT of chest &/or abdomen).

Procalcitonin –its value in de-escalating antibiotic therapy is well established in populations, in particular, those with community-acquired pneumonia & respiratory tract infections

The reference value for procalcitonin in adults is less than 0.1 ng/mL. Levels greater than 0.25 ng/mL can indicate the presence of an infection.

INITIAL RESUSCITATIVE THERAPY

The initial resuscitation is the rapid restoration of perfusion & the early administration of antibiotics.

1. Tissue perfusion is predominantly achieved by the aggressive administration of IV fluids, usually, normal saline given at 30 mL/kg (actual body weight), started by one hour & completed within the first three hours following the presentation.
2. Treating metabolic acidosis — Whether metabolic acidosis associated with sepsis should be treated with bicarbonate.
3. Empiric antibiotic therapy (first hour) — Prompt identification & treatment of the site(s) of infection is the primary therapeutic intervention, with most other interventions being purely supportive.

INITIAL RESUSCITATIVE THERAPY

4. Identification of suspected source — Empiric antibiotics should be targeted at the suspected source(s) of infection which is typically identified from the initial brief history & preliminary laboratory findings & imaging

End