

Bloodstream infections

Sepsis

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

New bedside clinical score: quickSOFA (qSOFA):

Respiratory rate 22/min or greater

Blood pressure 100 mm Hg or less

Altered mentation

C. DIAGNOSIS

1. We recommend that appropriate routine microbiologic cultures (including blood) be obtained before starting antimicrobial therapy in patients with suspected sepsis or septic shock if doing so results in no substantial delay in the start of antimicrobials. Appropriate routine microbiologic cultures always include at least two sets of blood cultures (aerobic and anaerobic).

D. ANTIMICROBIAL THERAPY

1. We recommend that administration of IV antimicrobials should be initiated as soon as possible after recognition and within one hour for both sepsis and septic shock.
2. We recommend empiric broad-spectrum therapy with one or more antimicrobials for patients presenting with sepsis or septic shock to cover all likely pathogens.

Sepsis

1. Singer M, Deutschman CS, Seymour CW et al (2016) The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA* 315(8):801–810
2. Shankar-Hari M, Phillips GS, Levy ML et al (2016) Developing a new definition and assessing new clinical criteria for septic shock: for the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA* 315(8):775–787
3. Seymour CW, Liu VX, Iwashyna TJ et al (2016) Assessment of clinical criteria for sepsis: for the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA* 315(8):762–774
4. Rhodes A et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016, *Intensive Care Med* (2017) 43:304–377

Infective endocarditis (IE)

Bloodstream infection, defined by infection (presence of a vegetation, i. e. an infected thrombus) of a native or prosthetic heart valve, the endocardial surface, or an indwelling cardiac device.

Native heart valves

Prosthetic heart valves

Different therapeutic strategy including recommended empirical antimicrobials

Microbiological diagnosis

At least three sets of blood cultures taken before antibiotic administration at 30-min intervals, each containing 10 mL of blood, incubated in both aerobic and anaerobic atmospheres.

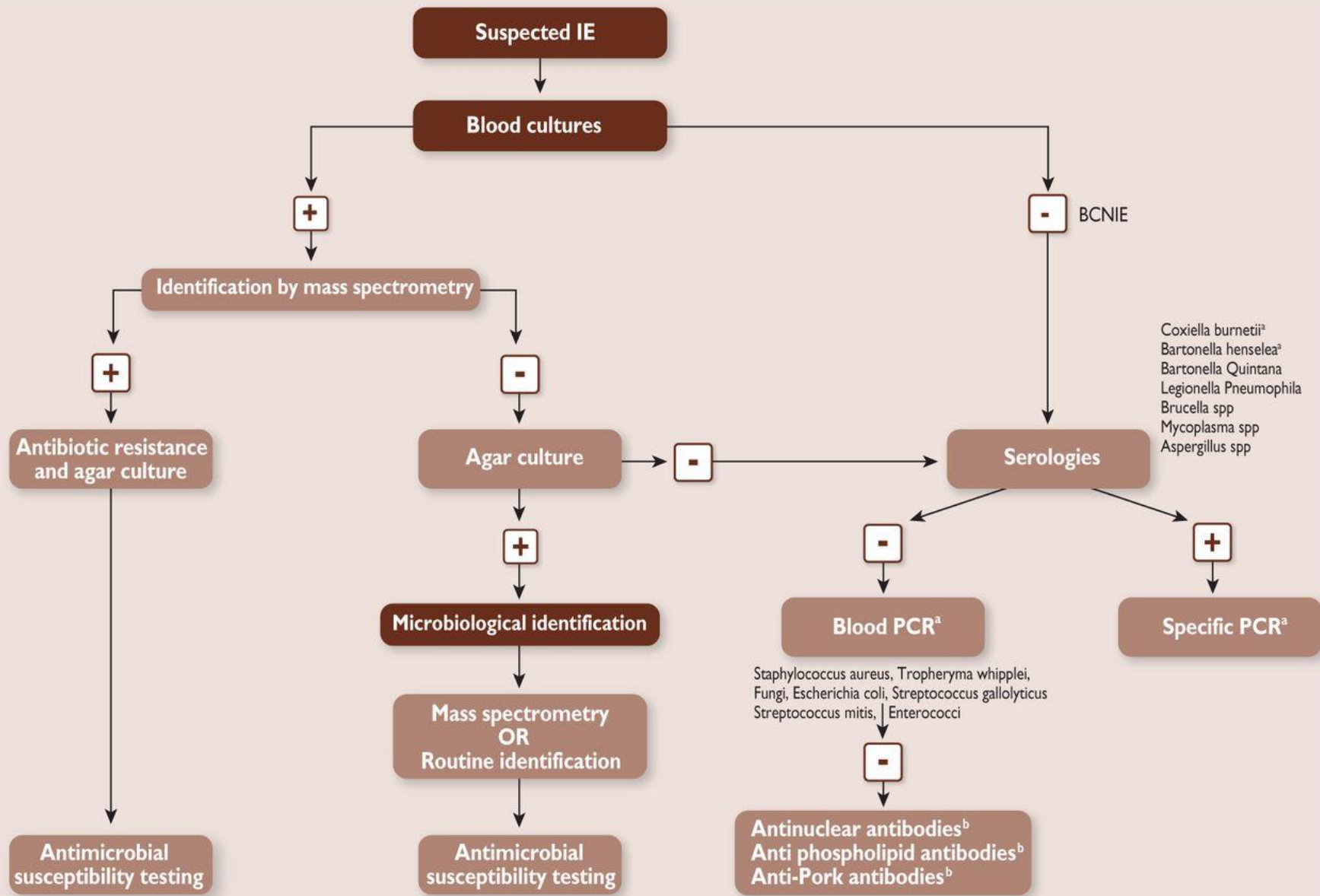
Sampling from a peripheral vein rather than from a central venous catheter using a meticulous sterile technique.

In IE, bacteraemia is almost constant

The microbiology laboratory should be aware of the clinical suspicion of IE at the time of blood culture sampling.

When a microorganism has been identified, blood cultures should be repeated after 48–72 h to check the effectiveness of treatment. Automated machines perform continuous monitoring of bacterial growth

When a positive blood culture bottle is identified, presumptive identification is based on Gram staining. This information is immediately given to clinicians in order to adapt presumptive antibiotic



BCNIE = blood culture-negative infective endocarditis; IE = infective endocarditis; PCR = polymerase chain reaction.

^aQualified microbiological laboratory

^bImmunological laboratory

IE - causative agents

Viridans streptococci and *S. bovis* group x *S. anginosus* group

Staphylococci

Enterococci

Gram negative bacteria – *Enterobacterales*, non-fermenters x **HACEK**

Fungi, predominantly yeasts

Bloodstream infections associated with intravascular device

Catheter - related

Catheter removal – for treatment and diagnosis

Biological material for culture

YES

Blood culture – peripheral sterile venepuncture

Catheter distal tip 3 – 4 cm, pus or liquid, if present adjacent to the device

NO

Intact skin swabs not valid

Catheter in situ– blood collection from catheter and peripheral vein at the same time, significant difference in time to positivity is 2 h (automated blood culture systems)

Biofilm – bacteria, yeasts. ATB/ATM therapy adjustment.

Infections associated with implanted cardioverter/defibrillator

Laboratory procedure

The culture of the catheter tip can be made with a quantitative or a semi-quantitative method. **For quantitative culture, the tip is sonicated or vortexed in a 1-mL solution with a significant threshold of 10³ CFU/mL** to distinguish between colonization and contamination (Brun–Buisson method) (All). **For the semi-quantitative method, the catheter tip is rolled on an agar plate (Roll-plate method, also called the Maki method).** The threshold is 15 CFU

For the diagnosis of catheter-related bloodstream infections, catheter in situ Paired blood cultures from a catheter and a peripheral vein with one of the two following differential criteria indicate biofilm infection: 1) TTP: 2 h earlier growth in the bottle with blood drawn from central venous catheter (CVC)

1- Male, 39 y, intravenous heroin abuser, application regular into the large veins. Wounds on all limbs , purple, partly necrotic, no pain or redness. Malnutrition. Malaise, anorexia, dyspnea, fever, chills lasting at least 1 week, Blood pressure 110/80, heart rate 90, T 38,2 °C, murmur, CRP 120, procalcitonin 1,5, lleucocytosis.

Microbiological diagnostic procedure

Empirical ATB therapy if indicated

2. Female, 75 y, long-term treatment for disseminated colorectal carcinoma, recently repeated surgical revisions of the abdominal cavity, transported urgently to ICU confused, dyspnea, heart rate 100/min, respiratory rate 25/min, T 36,1 °C. CRP 70, procalcitonin 19, leucocytosis.

Microbiological diagnostic procedure

Empirical ATB therapy if indicated

3. Female 75 y, pneumococcal pneumonia treated successfully with cefotaxime i.v., intravenous catheter - v subclavia l. dx. New episode of fever, chills, CRP and leucocytes elevated. Xray of chest and US of abdominal cavity normal, skin normal.

Microbiological diagnostic procedure

Empirical ATB therapy if indicated

4. boy, 7y, innate mitral valve impairment, mild respiratory infection once yearla, no ATB, diarrhea 2 months ago, agent not found.

He is being subfebrile last 3 weeks, suffers from malaise, sweats at night, amoxicillin/clavulanate p.o. administered for 1 week, he felt better, now it looks like recurrence of his ailment.

Microbiological diagnostic procedure

Empirical ATB therapy if indicated

