Blood culture

Blood culture is a microbiological laboratory test of the blood for the presence of bacteria.

General principles for taking samples

When to take blood culture

Patient suspected of a bacterial infection:

- CRP> 60 mg / l;
- history of fever - taking ideally when the temperature rises, preferably body temperature> 38 °, but not necessary;
- the patient should not be given any antibiotics before taking the blood culture.

How to collect blood culture

BERAN, Ondřej: *Laboratory diagnostics of infectious diseases* is essential for sampling. [Lecture for the 5th year of the 1st Faculty of Medicine, Charles University (infectious medicine, general medicine)]. Prague, April 18, 2011. </ref>:

- two samples are taken in the set - one for aerobic and the other for anaerobic cultivation;
- usually 2 sets are taken, each from one hand (a total of 4 vials for blood culture, see picture);
- the results of cultivation will not affect the use of non-coagulated blood with sodium citrate in the classical ratio (Na-citrate: blood 1: 9 to 1: 4) [1]
- This feature can be used to reduce the number of injections into the patient - when taking blood for basic laboratory tests, blood is taken into a special syringe and citrate is added, with a high CRP result, blood from the syringe is applied to culture vials - these are quite expensive in itself and taking blood directly into them, when we don't know if we will send them or not, seems uneconomical.

Disinfection of the sampling site:

- venous blood is most often taken from cubital fossa;
- 2 disinfectants are used [2]:

1. alcoholic - to remove biofilm bacteria on the skin surface
2. another disinfectant

- 10   ml of blood is taken into each culture vial;
- a skin swab is removed from the collection site for cultivation.

Blood culture

Processing and evaluation

Today, modern devices are used to cultivate and at the same time detect the presence of bacteria, which maintain a constant culture temperature of 37 ° C. If there are bacteria in the sample, the product of their metabolism is CO_2 . The instrument checks the CO_2 concentration in each sample every 20 minutes. If the limit value of CO_2 is exceeded, the device triggers an alarm. Samples are usually left in the instrument for 5   days.

File:Proncip detection.PNG

Detection principle in the automatic analyzer: when the limit concentration CO_2 in the blood culture is exceeded, the device triggers an alarm (green arrow)

Based on the blood culture, we will only find out whether bacteria (aerobic or anaerobic) are present in the patient's blood. We will not find out the exact agent or its sensitivity to antibiotics. The subsequent classical cultivation examination on nutrient media will be used for this purpose.

Interpretation

A positive result confirms the presence of bacteria in the patient's blood (bacteremia). To eliminate the possibility of contamination of the collected sample (false positives), a swab is cultured from the sampling site. The most common contamination is *Staphylococcus epidermidis* (coagulase negative staphylococci)

[3]. The cause of the contamination is often collection through the venous catheter. Contamination is more usual in case of venous catheters compared to arterial catheters or collection from the peripheral vein. [4]. The risk of contamination of the blood culture is lower during a single sampling from periphery even in comparison to the sampling from the newly inserted venous catheter. [3].

Links

Related articles

- nutrient agar
- Inoculation of agars
- Blood count
- Hemocoagulation ■ Blood clotting test ■ Bleeding examination ■ Erythrocyte sedimentation
- Biochemical analysis ■ Laboratory test for acid-base balance
- Blood culture ■ CRP ■ PCT

Source

- ws:https://www.wikiskripta.eu/w/Hemokultura

- BERAN, Ondřej: *Laboratorní diagnostika infekčních nemocí*. [Přednáška pro 5. ročník 1. LF UK (infekční lékařství, všeobecné lékařství)]. Praha, 18.4.2011.

References

1. BERAN, Ondřej: *Laboratorní diagnostika infekčních nemocí*. [Přednáška pro 5. ročník 1. LF UK (infekční lékařství, všeobecné lékařství)]. Praha, 18.4.2011.
2. According to telephone consulation with MUDr. Václava Adámková, senior doctor of the clinical microbiology department and antibiotic center of Institute of Medical Biochemistry and Laboratory Diagnostics VFN and 1st Medical Faculty in Prague, date 22.10.2013.
3. HOLUB, Michal: *Principy antibiotické léčby*. [Přednáška pro 5. ročník 1. LF UK (infekční lékařství, všeobecné lékařství)]. Praha, 11.4.2011.
4. NORBERG, Alonna, Norman C CHRISTOPHER a Maria L RAMUNDO, et al. Contamination rates of blood cultures obtained by dedicated phlebotomy vs intravenous catheter. *JAMA* [online]. 2003, vol. 289, no. 6, s. 726-9, available at <https://www.ncbi.nlm.nih.gov/pubmed/12585951>. ISSN 0098-7484.
5. STOHL, Sheldon, Shmuel BENENSON a Sigal SVIRI, et al. Blood cultures at central line insertion in the ICU, a comparison with peripheral venipuncture. *Journal of clinical microbiology* [online]. 2011, roč. 5, vol. 49, s. 2398-2403, available at <https://www.ncbi.nlm.nih.gov/pubmed/21525219>. ISSN 0095-1137.

1. According to the telephone consultation of Václav Adámková, MD biochemistry and & nbsp; laboratory diagnostics VFN and & nbsp; LF in & nbsp; Prague, on & nbsp; 22.10.2013.
2. HOLUB, Michal: *Principles of antibiotic treatment* . [Lecture for the 5th year of the 1st Faculty of Medicine, Charles University (infectious medicine, general medicine)]. Prague, April 11, 2011.
3.
4.