SEPSIS KILLS

PAEDIATRIC BLOOD CULTURE GUIDELINE

UPDATED SEPTEMBER 2016

INTRODUCTION

Detection of bacteremia or fungaemia by blood culture is critical in managing patients with infection, and directs the appropriate selection of antimicrobials[1].

Accuracy of test results will rely on correct blood volume, improving confirmation of bacteremia or fungaemia and minimising the risk of contamination.

This guideline does not take the place of local guidelines or policy.

Selected patients with fever of unknown origin who appear unwell or are at risk of sudden deterioration, such as infants or those with chronic illness, but do not meet criteria for the sepsis pathway may benefit from blood cultures. Discuss these patients with the Staff Specialist or senior doctor in charge of the department or overseeing patient care.

This guideline is intended for paediatric patients (1 month – 16 years of age).

For Adult and Neonatal Blood Culture sampling guidelines refer to the CEC sepsis website.

Blood cultures are recommended for children with any of the following:

- criteria for commencement on the Paediatric Sepsis Pathway
- fever and immunocompromised
- fever or evidence of infection and a vascular access device
- fever and recent overseas travel
- confusion and irritability

IMPORTANT POINTS TO REMEMBER:

- Blood cultures remain the 'gold standard' for the detection of microbial pathogens related to bacteraemia and sepsis[2]
- The optimal recovery of bacteria and fungi from blood depends on culturing an adequate volume of blood[1,3]
- Always use aseptic technique - correct technique may help reduce the risk of a false positive test result[3]
- Ensure hand hygiene is attended as per '5 moments for Hand Hygiene'.

PROCEDURE

1. Inform patient/parent/guardian of the procedure and purpose and obtain verbal consent
2. Prepare patient and family using appropriate distraction therapies for the child's age
3. Perform hand hygiene (Moment 1: Before patient contact)[3, 4]
4. Check patient identification and chlorhexidine allergy history
5. Perform hand hygiene, assemble and prepare equipment on a procedure trolley

   - Alcohol hand rub
   - Two aerobic blood culture bottles, check expiry date for each bottle
   - Mark 3 mL above the broth for fill level
   - Sterile gloves, small dressing pack, tape, tourniquet(s)
   - Eye protection
   - Alcohol (ethanol or isopropyl alcohol), or alcohol with chlorhexidine, according to local protocol
   - Winged infusion set with leash and Vacutainer® sleeve designed to fit over the neck of the blood culture bottle; if unavailable, use a winged infusion set with luer adapter and syringe or peripheral intravenous cannula
   - Sharps container

6. Put on protective eyewear and perform hand hygiene (Moment 1: Before patient contact)[3,4]
7. Remove the cap of each blood culture bottle and scrub the vial stoppers well using alcohol, or alcohol with chlorhexidine, and allow to dry completely
8. Position patient appropriately, apply tourniquet to palpate and identify appropriate vein
9. Perform hand hygiene (Moment 2: Before a procedure)[4]
10. Put on sterile gloves (essential if re-palpation occurs post cleansing of the venepuncture site)[1,3,5]
11. Using alcohol or alcohol with chlorhexidine[5] disinfect the venepuncture site using a scrubbing motion, spiralling out from the planned venepuncture site. Use a fresh swab for each scrub. Use 2-3 scrubs and do this for a total of 1-2 minutes, allowing the site to dry
12. Perform venepuncture using winged infusion set with luer adapter and Vacutainer® sleeve or peripheral cannula insertion
13. Fill each bottle only to the pre-marked 3 mL line (1-3 mL is satisfactory)[2] keeping blood culture bottle upright and below the level of the venepuncture. Invert bottles gently several times to prevent clotting
    - Always collect the blood culture bottles FIRST then, if required, collect additional blood pathology tubes at this point
    - Release tourniquet, tape cotton ball across the skin site and apply pressure (where possible request patient/parent/guardian to take over application of pressure)
14. Repeat steps 8 – 13 to collect blood for the second blood culture at a different peripheral site
15. Discard sharps, collect all rubbish/dirty items and dispose of appropriately
16. Remove gloves and perform hand hygiene (Moment 3: After procedure or body fluid exposure)[4]
17. In the health record:
    - Label each bottle with patient name, MRN, date/time for collection of blood and location of site used for each set. Do not cover bar codes or the bottom of the bottle
    - Place bottles into biohazard bag and arrange to send to the lab with request form. Transport bottles at room temperature
    - Document in the health record, number of sets of blood cultures that have been taken, sites and reason for site choice if this differs from a peripheral site
    - Perform hand hygiene
18. Explain to patient/patient's family/carer/guardian that results may not be available for 48 hours.

FREQUENTLY ASKED QUESTIONS

1. Most blood cultures come back negative – why bother taking them?

Studies show that insufficient blood sample will return a negative result[1,2,3,6]. Therefore it is important to follow the procedure for taking blood cultures and collecting a sufficient blood sample. The optimal recovery of bacteria and fungi from blood depends on culturing an adequate volume of blood. The direct correlation between the volume of blood cultured and yield relates to the low number of colony forming units (CFU) in a millilitre of adult blood. For each additional millilitre of blood cultured, the yield of microorganisms recovered from adult blood increases[3].

A positive result provides direct evidence of infection, enabling the antibiotic treatment to be directed against the demonstrated pathogen. Furthermore, cumulative antibiograms can be constructed by summarising antibiotic susceptibility of blood isolates- this then supports development of reliable empiric antibiotic treatment guidelines.

Click here for National Healthcare Safety Network (NHSN) Centers for Disease Control and Prevention Organism list.

2. What should I do in the event that I collect only a very small amount of blood?

It is recommended that 0.5 mL to 1 mL of blood is collected for infants, and 1 to ≥30 mL for older children[6]. Where possible, seek expert help in obtaining a larger blood sample.

3. Can I collect blood cultures from an intravenous cannula?

Collection of cultures via a cannula is NOT the preferred method[1]. However, if used it should only be from a cannula that has just been inserted. If blood is drawn for culture from an intravenous cannula, ideally a second specimen should be obtained from a peripheral site[1].

4. Following taking the blood cultures, how are they stored prior to transport to the laboratory?

Storage should be at room temperature and never refrigerated [3]. Where transport is delayed, the facility should liaise with the receiving laboratory to establish a simple guideline for sample storage.

REFERENCES:

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