Blood Culture Indications

Rationale

The goal of this guideline is to provide general indications/criteria for drawing blood cultures and potentially reduce unnecessary cultures. Unnecessary cultures contribute to increased length of stay, costs and laboratory turnaround time to provide results.

Indications for Ordering an “Initial” Blood Culture

- Blood cultures should be obtained prior to initiation of antimicrobial therapy for any patient in whom there is suspicion of a bacteremia or fungemia.

Use Clinical Decision Rule in Table 1 to help decide if blood cultures should be ordered.

Table 1: Blood Culture Clinical Decision Rule

<table>
<thead>
<tr>
<th>Major Criteria</th>
<th>Minor Criteria</th>
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</thead>
<tbody>
<tr>
<td>• Temperature &gt; 103°F</td>
<td>• Immunosuppression</td>
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<tr>
<td>• Known or suspected infection, such as:</td>
<td>• Indwelling vascular catheter</td>
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<tr>
<td>o [Febrile neutropenia]</td>
<td>• Hypotension (systolic blood pressure &lt; 90 mm Hg)</td>
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<tr>
<td>o Endocarditis</td>
<td>• White blood cell count (WBC) &gt; 18,000 cells/mm³</td>
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<tr>
<td>o [Sepsis]</td>
<td>or WBC &lt; 4,000 cells/mm³</td>
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<tr>
<td>o Septic arthritis</td>
<td>• PMN Bands &gt; 5%</td>
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<tr>
<td>o Meningitis</td>
<td>• Platelets &lt; 150,000 cells/mm³</td>
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<tr>
<td>o Osteomyelitis</td>
<td>• Temperature 100.4 – 102.9°F</td>
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<tr>
<td>o Peritonitis</td>
<td>• Chills</td>
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<td>o [Pneumonia] in ICU</td>
<td>• Age &gt; 65 Years</td>
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<tr>
<td>o ICU patient with cellulitis, skin/soft tissue infections, necrotizing</td>
<td>• Creatinine &gt; 2.0 mg/dL</td>
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<td>fasciitis or with comorbidities (e.g., diabetes, IV drug user)</td>
<td></td>
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</tbody>
</table>

Note:
- Do not repeat cultures if done at transferring hospital
- Do not order cultures for suspected viral infection

Indications for Ordering “Follow-up” Blood Culture(s) after an Initial Positive Blood Culture

Conditions that would be appropriate for follow-up blood cultures include:
- Known or suspected endocarditis.
- **Bacteremia due to Staphylococcus aureus**
- Presence of fever, leukocytosis more than 72 hours, or unknown source following initiation of pathogen directed therapy.
- Known or suspected site of infection with limited antimicrobial penetration (i.e. abscess or joint space infection).
- Presumed source of infection in abdomen or central nervous system.
- Presence of prosthetic vascular grafts, intravascular lines, or cardiac devices (i.e. pacemaker/AICD, VAD, IABP, ECMO).
- Presence of pathogens known or suspected to be resistant to standard antibacterial agents (i.e. MDR Pseudomonas, Acinetobacter, CRE).

In general, follow-up blood cultures are NOT needed unless there is a new concern for infection.

Clinical Examples

Blood cultures should only be ordered for patients when there is a clear indication. The following include examples of appropriate and inappropriate blood culture use.

**Appropriate Blood Cultures**
- Order a “follow-up” blood culture for a patient with a positive blood culture for a gram-positive pathogen (especially *S. aureus*) to confirm clearance.
- Document clearance of gram negative (GN) bacteremia, in situations with multi-drug resistant pathogens (e.g. Pseudomonas, Acinetobacter, ESBL-producers, carbapenemase-producers, etc.) or any (GN) pathogen when the source of the original infection is not clear or controlled.

**Inappropriate Blood Cultures**
- **DO NOT** order blood cultures reflexively every time a patient has a fever without considering whether a blood culture is truly indicated. (See indications).
- **DO NOT** order routine follow up blood cultures for susceptible GN enteric pathogens when the source of infection (e.g. UTI, pyelonephritis, abscess, etc.) is clearly known, adequately controlled and patient is clinically improving.
- If it is not clear whether or not the patient needs a blood culture, discuss with the attending physician.
Resources

- Standards of Practice: Blood Cultures
- All Infectious Disease Related Guidelines

References

- “Blood Cultures for the Detection of Bacteremia” Gary V. Doern, MD, Emeritus Professor of Pathology, University of Iowa; www.UpToDate.com

Authors

- Eric Adkins, MD
- Preeti Pancholi, PhD, D(ABMM)
- Julie Mangino, MD
- Kurt Stevenson, MD
- Christina Liscynesky, MD
- Shandra Day, MD
- Joan-Miquel Balada-Llasat, PharmD,PhD, D(ABMM)

Quality Measures

- Number of blood culture orders per patient
- Percent of patients with negative result
- Average number of cultures per patient
- Average number of cultures/patient with negative result

Guideline Approved


Disclaimer: Clinical practice guidelines and algorithms at The Ohio State University Wexner Medical Center (OSUWMC) are standards that are intended to provide general guidance to clinicians. Patient choice and clinician judgment must remain central to the selection of diagnostic tests and therapy. OSUWMC’s guidelines and algorithms are reviewed periodically for consistency with new evidence; however, new developments may not be represented.

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