2. Obtain Blood Cultures Prior to Administration of Antibiotics

Related Measures

Timing of Blood Cultures

Background

The incidence of sepsis and bacteremia in critically ill patients has been increasing in the past two decades.[8,9] Thirty percent to 50 percent of patients presenting with a clinical syndrome of severe sepsis or shock have positive blood cultures. Therefore, blood should be obtained for culture in any critically ill septic patient.

Collecting blood cultures prior to antibiotic administration offers the best hope of identifying the organism that caused severe sepsis in an individual patient. Failure to check blood cultures prior to antibiotic infusion will perhaps affect the growth of any blood borne bacteria and prevent a culture from becoming positive later.

Collection Strategy

Two or more blood cultures are recommended with at least one drawn percutaneously and one drawn through each vascular access device, unless the device was recently inserted (<48 hours).[1,2] In patients with suspected catheter-related infection, a pair of blood cultures obtained through the catheter hub and a peripheral site should be obtained simultaneously. Cultures of other sites (preferably quantitative, where appropriate), such as urine, cerebrospinal fluid, wounds, respiratory secretions, or other body fluids that may be the source of infection should also be obtained before antimicrobial therapy.[2] If the same organism is recovered from both cultures, the likelihood that the organism is causing the severe sepsis is enhanced. In addition, if the culture drawn through the vascular access device is positive much earlier than the peripheral blood culture (i.e., >2 hours earlier), it may offer support that the vascular access device is the source of the infection.[3] Volume of blood may also be important.[4]
Indications

Fever, chills, hypothermia, leukocytosis, left shift of neutrophils, neutropenia, and the development of otherwise unexplained organ dysfunction (e.g., renal failure or signs of hemodynamic compromise) are specific indications for obtaining blood for culture. Blood cultures should be taken as soon as possible after the onset of fever or chills.

While it remains difficult to predict bacteremia in patients with sepsis,[5] a number of clinical and laboratory parameters are independently correlated with the presence of bacteria in the blood of patients when infection is suspected. These include chills, hypoalbuminemia, the development of renal failure, and a diagnosis of urinary tract infection[5,6]; other criteria are new fever, hypothermia, leukocytosis and left shift of neutrophils, neutropenia, and signs of hemodynamic compromise.[7] Peaking fever appears to be more sensitive than leukocytosis to predict bacteremia[8]; however, fever and low-grade bacteremia can be continuous, such as in endocarditis.

Grading the Evidence

The 2012 Surviving Sepsis Campaign Guidelines recommend obtaining appropriate cultures before antimicrobial therapy is initiated if such cultures do not cause significant delay in antibiotic administration.

Evidence Grade 1C: This is a strong recommendation for care based on a number of qualitative considerations. The quality of the evidence generally derives from well-done observational or cohort studies with controls.

References

1. Create a standardized protocol to manage severe sepsis that includes reminders to draw blood cultures before administering antibiotics.

2. Place prompts in locations near antibiotic storage querying staff regarding whether blood cultures have been drawn.

3. Store first dose antibiotics in automated dispensing system on unit.

Content adapted extensively from: