Better Care by Reducing Blood Culture Contamination: Sepsis, SteriPath and Antimicrobial Stewardship

Blood Culture Contamination

* A blood culture is a test taken to determine if there are microorganisms in the blood that indicate the patient has a potentially serious infection. Forty percent to 60 percent of blood cultures are drawn in the emergency room, and many are also performed in the ICU, SICU and other step-down units throughout the hospital.

* Contamination can occur during the blood culture procedure from a multitude of sources: if aseptic technique and sterility are not maintained; if bacteria are introduced when the syringe or collection supplies are assembled; if some bacteria on the patient’s skin survive surface antisepsis and are dislodged by the needle used to access the patient’s bloodstream; if microbes contaminate the tops of standard blood collection tubes; and from bacteria commonly found in the environment where blood cultures are collected.

* Inaccurate blood cultures stress the healthcare system in several ways and have a major financial impact, with the cost of a single, false positive blood culture averaging $8,720. False-positive cultures comprise of up to half of all positive blood cultures in adult patients. Stresses to the healthcare system include unnecessary hospitalization or extended length of hospital stay; the need for additional blood cultures and other diagnostic tests; and increased workload for technologists and other staff.¹

* Clinical confusion from false positives can lead to unnecessary and expensive clinical procedures, inappropriate and overuse of antibiotics, extended length of stay and risk of hospital-acquired conditions.²

SteriPath®

* SteriPath is a self-contained, preassembled, sterile blood collection system. It provides
proprietary vein-to-bottle technology that significantly reduces blood culture contamination. Blood is drawn by a healthcare practitioner from the patient (typically from a vein in the arm). The SteriPath system diverts the initial portion (1.5 to 2.0 milliliters) of the blood draw into a separate chamber, safely sequestering skin and other contaminants. A new, second sterile blood flow path is then created allowing the remainder of the blood sample to be collected in the culture bottle and sent to the lab.

* The patented SteriPath system has been shown in multiple studies to dramatically reduce an institution’s rate of blood culture contamination by more than 85 percent to as low as 0.2 percent -- more than ten times better than the benchmark of 3 percent false positives recommended by the American Society for Microbiology.

Recent studies documenting the efficacy of the system include:

-- “Reduction in Blood Culture Contamination Through Use of Initial Specimen Diversion Device” by Rupp ME, et al. in Clinical Infectious Diseases, 2017 (In press. Manuscript: https://tinyurl.com/m6w9ved)³
88 percent decrease in false positives

-- “Reducing Blood Culture Contamination with the SteriPath Blood Collection Kit” by Huss JL, RN, et al. Scientific poster at Uniformed Services University of the Health Sciences, 2016.⁴
90 percent decrease in false positives

--“Reducing the Laboratory Cost of False Positive Blood Cultures in the Adult Emergency Department” by Gauld LL, et al. Medical University of South Carolina. Scientific poster at IHI National Forum on Quality Improvement in Healthcare 2016.⁵
86 percent decrease in false positives

Antimicrobial Stewardship

* “Antimicrobial stewardship” encompasses clinical and policy efforts to promote the appropriate use of antibiotics and other antimicrobials.⁶

*False positive blood cultures often cause patients to be subjected to additional unnecessary laboratory tests and to be treated with inappropriate antibiotics that can extend hospital length of stay, which in turn increases risk of hospital-acquired infections or conditions. All this occurs at a cost to the American health care system of more than $4 billion in overtreatment annually.

* Misuse and overuse of antimicrobials pose pressing national and international health care problems. They increase the chance that antimicrobials designed to kill dangerous organisms will become ineffective because the organisms have adapted to the drugs.
* Antibiotics — especially the powerful drugs used to treat sepsis -- often have serious side effects, including adverse drug reactions and Clostridium difficile infection (C. diff). Patients who receive antibiotics unnecessarily are exposed to these risks without gaining any clinical benefit. 

* People infected with antimicrobial-resistant organisms may be more likely to die as a result of an infection and are also more likely to have longer, more expensive hospital stays. 

* The Joint Commission now requires all accredited hospitals, critical access hospitals, and nursing care centers to have an antimicrobial stewardship program.

Sepsis

* Sepsis is a potentially life-threatening condition that occurs when the body unleashes an inflammatory response to an infection. The inflammation can ultimately damage multiple organ systems and cause them to fail.

* Sepsis kills an estimated 258,000 U.S. hospital patients every year, and over 1.6 million people in the U.S. are diagnosed with sepsis every year.

* Blood cultures are the essential blood test used to diagnose sepsis. But with traditional methods, 20 to 50 percent of positive blood cultures are contaminated and ultimately determined to be false positive for sepsis — that is, they falsely indicate that a patient has sepsis when they in fact do not.

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FOOTNOTES


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