Lack of Predictive Value of Isolating Coagulase-Negative Staphylococci from Blood Cultures

Sir—Herwaldt et al. [1] reported that, in their intensive care unit, 26.4% of patients whose Isolator (Wampole Laboratories, Cranbury, NJ) blood cultures yielded coagulase-negative staphylococci (CNS) had true bloodstream infections. These authors defined infection according to a set of criteria. They then analyzed their findings to determine the variables associated with infection.

A basic fault in the study is the specificity of the selected criteria: fever, appropriate treatment, physician’s implicit definition of infection, meeting the Centers for Disease Control and Prevention (CDC) definition of bloodstream infection, and additional criteria in nonneutropenic patients. Although these criteria may be reliable for the evaluation of patients who are not critically ill, their value in the intensive care unit (ICU) has not been established [2].

Since the predictive value of any parameter is influenced by its prevalence, we need to examine each of the selected criteria in relation to the condition of patients in the ICU. For instance, I believe that the predictive value of fever in this patient population is unknown. Although afebrile patients are unlikely to have infection, the opposite may not be true. Since fever is not an uncommon finding in patients in the ICU and blood cultures are usually performed for febrile patients, predicting the presence of infection on the basis of fever may not be accurate. Had the authors stated the frequency of fever in their patient population and whether other causes of fever had been excluded, this criterion might be acceptable.

The criterion of reliance on the physician’s decision to treat the patient must also be examined carefully. Although most clinicians can distinguish true infection from contamination in noncritically ill patients, precise distinction in the ICU is not possible; this conclusion is supported by the widespread use of antibiotics in the ICU. I believe that the threshold at which antibiotic therapy is deemed necessary by clinicians is much lower for patients in these units.

It would have been helpful if the authors had stated whether the physician’s decision to treat was rendered before blood culture results had been obtained or if treatment was initiated after the results were noted. It would have been preferable if multiple observers had clinically assessed patients’ conditions without having knowledge of blood culture results and had selected cases on the basis of a consensus.

The third criterion, meeting “the treating physician’s implicit definition of infection,” is redundant; it is an additional measurement of the clinician’s judgment.

As to the removal of a potentially infected foreign body, Herwaldt et al. did not specify how the foreign body was deemed potentially infected, whether it was removed after receipt of blood culture results, or if it was cultured. Although the isolation of CNS from a foreign body may represent contamination, this finding will strengthen the possibility of true bacteremia, especially if the isolates are typed by a reliable method [3].

The “additional diagnostic criteria for nonneutropenic patients” that the authors cited are known to be nonspecific, and such findings can be observed in any systemic inflammatory-response syndrome, irrespective of its etiology [4]. Herwaldt et al. used the CDC’s definition of nosocomial bloodstream infections for distinguishing true infection from contamination. Although this definition is considered the cornerstone of any meaningful epidemiological investigation, its clinical relevance remains uncertain.

The problem associated with isolating CNS from a blood culture is not limited to cases in which a single culture is positive. In a recent study, my colleagues and I used a molecular typing method to demonstrate that when multiple blood cultures were positive, the isolates were genetically unrelated in 55.3% of the cases, suggesting a high prevalence of contamination [5]. The impact of overdiagnosing infection due to CNS may have far-reaching results including overuse of antibiotics and misdirection of clinicians, who will be provided with a false sense of security and discouraged from pursuing other causes of fever.

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References

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