Sterilization of Skin and Catheters before Drawing Blood Cultures

The interpretation of blood culture results has become a day-to-day problem in hospitals. The minireview by M. Weinstein provides excellent insights into the problem in a short, precise, clinically applicable form (3). The reason for the increased rate of contamination is explained in part by the difficulty of sterilizing the skin at the insertion site and/or the catheter.

It is implied that one can sterilize the skin and/or the catheter with appropriate disinfectants. However, sterilization sensu strictu according to ISO 14937 is defined for medical devices only (4). Sterilization of the skin implies the absence of any living bacteria. Disinfectants used on skin and tissue, called antiseptics, are unable to sterilize the skin. Even worse, a few residual bacteria will survive, even after the most vigorous disinfection process before surgical interventions (1). In one study, bacterial growth was observed in over 88% of the samples taken after disinfection of the skin, just before the intervention (2). Therefore, application of appropriate disinfectants, with the proper concentration and application time, reduces the rate of infection, and this reduction is more likely to occur when the disinfection is performed by a professional intravenous-administration team. In addition, it makes sense to apply the two-needle technique to reduce the rate of contamination as suggested by the author.

The term sterilization as used in Weinstein's article (3) is misleading and may impede a full understanding of the concept of decreasing, but not eliminating, bacteria and/or spores by a disinfection process. Given the fact that none of the currently available skin disinfectants are able to eliminate all bacteria, a low rate of contamination of blood cultures will continue to challenge clinicians. Weinstein's outstanding review may guide the clinician to correctly interpret the results from blood cultures, but some uncertainty will remain.

REFERENCES

Author’s Reply

Dr. Widmer’s letter raises two important issues. The first relates to whether or not a skin venipuncture site can be sterilized. Whereas one should consider the act of obtaining blood for culture a procedure done using a sterile technique, I agree that it is not possible to sterilize the skin completely for the reasons stated above. Accordingly, as pointed out in my review (3), we can strive to minimize contaminated blood cultures but we will never achieve contamination rates of 0 (2).

The second issue raised by Widmer is more problematic. As stated in the review (3), use of the two-needle technique rather than the single-needle method to obtain and inoculate blood cultures can reduce contamination rates by approximately 1.5% (1). However, this benefit must be balanced against the small but finite risk of a needle stick injury that occurs with each manipulation of these devices, as well as the secondary risk of infection caused by blood-borne pathogens, such as human immunodeficiency virus and hepatitis C virus. The current recommendations for blood culturing place greater emphasis on reducing the risk of a needle stick injury to a health care worker than on a small reduction in the rate of blood culture contamination, thus the recommendation for use of the single-needle rather than the two-needle method for obtaining and inoculating blood culture vials.

REFERENCES

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