

courage the use of a central venous catheter (CVC) when obtaining blood for culture for bacteremia or fungemia. However, data on the reliability of cultures done with blood obtained from CVCs are conflicting.

DesJardin and colleagues conducted a retrospective cohort study of hospitalized patients with cancer in whom samples for paired blood cultures were drawn through CVC and peripheral venipuncture. Blinded assessments of culture results done by infectious disease experts were used as the gold standard. Sensitivity, specificity, and positive and negative predictive values were compared for culture of blood from CVCs and culture of blood from peripheral venipuncture.

Of 551 paired cultures, 469 (85%) were catheter-negative/venipuncture-negative, 32 (6%) were catheter-positive/venipuncture-positive, 17 (3%) were catheter-negative/venipuncture-positive, and 33 (6%) were catheter-positive/venipuncture-negative pairs. For the 82 paired cultures with at least one positive result, blinded determination of true bacteremia or fungemia was made by two infectious disease specialists. For catheter draw and peripheral venipuncture, sensitivities were 89% and 78%, specificities were 95% and 97%, positive predictive values were 63% and 73%, and negative predictive values were 99% and 98%.

The authors concluded that, in hospitalized hematology-oncology patients, culture of blood drawn through either the CVC or peripheral vein shows excellent negative predictive value. Culture of blood drawn through an indwelling CVC has low positive predictive value, apparently less than from a peripheral venipuncture. Therefore, a positive result from a catheter needs clinical interpretation and may require confirmation. However, the use of a catheter to obtain blood for culture may be an acceptable method for ruling out bloodstream infections.

FROM: DesJardin JA, Falagas ME, Ruthazer R, Griffith J, Wawrose D, Schenkein D, et al. Clinical utility of blood cultures drawn from indwelling central venous catheters in hospitalized cancer patients. *Ann Intern Med* 1999;131:641-647.

## Diagnosis of CVC-Related BSI

Current methods for the diagnosis of bloodstream infection (BSI) related to central venous catheters (CVCs) are slow and in many cases require catheter removal. Since most CVCs that are removed on suspicion of causing infec-

tion prove not to be infected, removal of catheters unnecessarily exposes patients to the risks associated with reinsertion. The Gram stain and acridine-orange leucocyte cytospin (AOLC) test, done on blood samples withdrawn through the CVC, is effective in the rapid diagnosis of BSI in neonates, but has yet to be proven in adults. The Gram stain and AOLC is rapid (30 minutes), inexpensive, and requires only 100  $\mu$ L of blood and the use of light and ultraviolet microscopy. Kite and colleagues evaluated the Gram stain and AOLC test in suspected cases of CVC-related BSI in comparison with two methods requiring catheter removal (tip roll and tip flush) and with a third technique, done in situ (endoluminal brush), in conjunction with quantitative peripheral-blood cultures.

Kite and colleagues assessed 128 cases of suspected CVC-related BSI in 124 adult surgical patients (median duration of CVC placement was 16 days). In 112 cases (88%), CVC blood was obtainable. CVC-related BSI was diagnosed in 50 cases (culture of the same organism from the catheter, in material numbers, and from peripheral-blood culture). The sensitivity of the Gram stain and AOLC test was 96%, and the specificity was 92%, with a positive predictive value of 91% and a negative predictive value of 97%. By comparison, the tip-roll, tip-flush, and endoluminal-brush methods had sensitivities of 90%, 95%, and 92%, and specificities of 55%, 76%, and 98%, respectively.

The authors concluded that the Gram stain and AOLC test is a simple and rapid method for the diagnosis of CVC BSI. This diagnostic method compares favorably with other diagnostic methods, particularly those that require the removal of the catheter, and can permit early targeted antimicrobial therapy.

In an accompanying editorial, Barry Farr, MD, MSc, points out that physicians are likely to continue to collect two blood samples for qualitative blood cultures to investigate the cause of fever, so the gram-acridine technique could be regarded as an extra expense. The issue of the relative cost-effectiveness of diagnostic techniques could be resolved by a trial in which patients are randomly assigned management with different diagnostic strategies.

FROM: Kite P, Dobbins BM, Wilcox MH, McMahon MJ. Rapid diagnosis of central-venous-catheter-related bloodstream infection without catheter removal. *Lancet* 1999;354:1504-1507.

Farr BM. Accuracy and cost-effectiveness of new tests for diagnosis of catheter-related bloodstream infections. *Lancet* 1999;354:1487-1488.

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