

In patients on HD, blood culture results are the most sensitive, specific, and accurate for diagnosing CRBSIs when taken from the HD circuit and the venous catheter hub, and blood culture results are the least sensitive, specific, and accurate in any combination with peripheral vein cultures” Quittnat Pelletier et al (2016).

Abstract:

BACKGROUND AND OBJECTIVES: Guideline-recommended diagnostic criteria for hemodialysis (HD) catheter-related bloodstream infections (CRBSIs) are based on data from indwelling central catheters in patients not on HD and non-HD situations, and upon which peripheral vein cultures are the gold standard. We aimed to examine the validity of these criteria in patients on HD.

DESIGN, SETTINGS, PARTICIPANTS, & MEASUREMENTS: Adult patients on in-center HD using catheters were prospectively followed from 2011 to 2014 at a large academic-based HD facility (Toronto, Canada). When a CRBSI was suspected, blood culture sets were obtained from four sites (peripheral vein, both catheter hubs, and HD circuit) to determine the guideline-recommended differential time to positivity (DTTP). DTTP criteria were met when catheter hub cultures turned positive ≥ 120 minutes before peripheral vein cultures. The sensitivity, specificity, and accuracy were first calculated using peripheral vein cultures as the gold standard and then these same calculations were repeated with additional information, including exit site/catheter tip and HD circuit cultures, as the true gold standard. The feasibility of obtaining peripheral vein cultures was determined.

RESULTS: Of 178 suspected CRBSIs, 100 had peripheral vein blood cultures. Using the true gold standard, sensitivity, specificity, and accuracy of blood culture results were highest in samples from the HD circuit (93.5%, 100%, and 95%, respectively). The guideline recommended combination of peripheral vein and arterial hub blood cultures was the least sensitive, specific, and accurate (91.7%, 93.1%, and 92.7%, respectively). The diagnostic criteria using measured DTTP were met in less than one third of events.

CONCLUSIONS: In patients on HD, blood culture results are the most sensitive, specific, and accurate for diagnosing CRBSIs when taken from the HD circuit and the venous catheter hub, and blood culture results are the least sensitive, specific, and accurate in any combination with peripheral vein cultures. The DTTP does not increase diagnostic accuracy, reducing the necessity for venipuncture and its potential vein damage. Future guidelines should consider the applicability of criterion on specific patient populations and tailor them accordingly.

Reference:

Quittnat Pelletier, F., Joarder, M., Poutanen, S.M. and Lok, C.E. (2016) Evaluating Approaches for the Diagnosis of Hemodialysis Catheter-Related Bloodstream Infections. Clinical Journal of the American Society of Nephrology April 1st. .

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