Procalcitonin Guidance Leads to Shorter Duration of Antimicrobial Therapy

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Scott J, Deresinski S.
Use of biomarkers to individualize antimicrobial therapy duration: a narrative review.
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In this narrative review, procalcitonin (PCT) was shown to help optimize the duration of antimicrobial therapy in patients hospitalized with respiratory tract infections (RTIs) or sepsis, thereby supporting effective antimicrobial stewardship.

Antimicrobial therapy (AMT) optimization is an ongoing challenge that requires utilization of tools and resources available. Successful AMT programs will help reduce the overuse of antimicrobials, which is necessary for minimizing antimicrobial-associated adverse effects, optimizing resource utilization, and limiting multidrug-resistant organism rise. Biomarkers, such as PCT, C-reactive protein (CRP), and, more recently, multi-protein and RNA signatures, reflect host responses to infection and may help minimize unnecessary antimicrobial usage.

Randomized controlled trials (RCTs), observational studies, and meta-analyses assessing biomarker-guided approaches to AMT decision-making and their impact on duration of therapy were reviewed.

Several RCTs and real-world observational studies show that a PCT-guided strategy helps clinicians individualize and safely and effectively reduce AMT duration. This is largely shown using a PCT cutoff of <0.25 µg/L in non-critically ill patients who are hospitalized with suspected RTIs, and <0.5 µg/L or ≥80% decline in peak level in critically ill patients with RTIs or sepsis. The impact of utilizing other biomarkers was found to be less clear and requires further study.

PCT provides antimicrobial stewardship benefits in clinical settings by reducing the initiation, overall exposure, and duration of AMT. For example, the ProCAP* study showed a PCT-guided group receiving a 55% shorter duration of AMT compared with the control group. In addition, the ProHOSP** study showed similar results with the PCT-based approach lowering the mean duration of AMR by 35%.

"PCT should be considered as a prognostic rather than diagnostic marker that can provide clinicians with the reassurance that prolonging therapy is unlikely to be necessary in certain scenarios," concluded the study authors.

* Christ Crain M, Stolz D, Bingisser R, *et al.* Procalcitonin guidance significantly reduces antibiotic duration in community-acquired pneumonia: the 'ProCAP' study. Critical Care 2005;9(Suppl 1):P166

** Schuetz P, Christ-Crain M, Thomann R, *et al.* Effect of Procalcitonin-Based Guidelines vs Standard Guidelines on Antibiotic Use in Lower Respiratory Tract Infections: The ProHOSP Randomized Controlled Trial. JAMA 2009;302(10): 1059-1066