Procalcitonin Probe: A Heralded Biomarker Gets Critical Assessment

Latest evidence suggests a more circumspect testing role with unrestricted ordering limited to ICUs; labs urged to guide other requests for appropriate use.

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Researchers and clinicians alike have placed stock in procalcitonin (PCT) testing for differentiating between infectious and noninfectious disease and for stratifying morbidity and mortality risk. However, more evidence about the limitations of this biomarker has become available, prompting three researchers to discuss in a review PCT's role in the work-up of sepsis and other infectious diseases-related conditions. The authors also make a case for why this biomarker isn't quite ready for widespread use in healthcare settings.

PCT is an expensive test, which can burden clinical laboratories' budgets if requests spin out of control. "Our experience has taught us that its determination is often requested inappropriately, without an adequate consideration of the existing scientific evidence," Elena Aloisio, MD, the article's first author, told *CLN Stat*. Aloisio, along with co-authors Alberto Dolci, PhD and Mauro Panteghini, MD, sought to inform clinicians and clinical laboratory professionals on how to use PCT testing in an evidence-based and cost-effective manner by considering its real advantages and limitations.

A helpful marker in certain clinical situations, PCT has its criticalities, Aloisio said. "Although some users believe in the diagnostic ability of PCT to detect sepsis, this is not definitively confirmed by the scientific literature." For example, using PCT

to optimize antibiotic therapies in critically ill patients can be cost-effective—but only if there's high adherence to proposed algorithms for antibiotic stewardship, she stressed. Evidence also exists that PCT may be useful in pediatrics, especially in children with suspected meningitis, "even if some confounding factors, such as the physiologically higher concentrations in newborns with less than 72 hours of life, should be correctly managed," Aloisio offered.

Not enough clinical evidence supports open PCT use in the healthcare system at this time, according to Aloisio and her colleagues. In their analysis, the authors rated PCT as a poor diagnostic and prognostic marker for sepsis, citing insufficient evidence for supporting the utility of PCT as a single measurement. "As expected from its metabolic regulation, the analyte has a relatively high interindividual variability, with a low index of individuality, which implicates that the use of population-based reference intervals or decision limits to interpret single PCT results may be inadequate," the authors summarized. In addition to the test's high price tag, compliance with PCT-driven protocols isn't very good. PCT's optimal use appears to be in intensive care settings as a guide for determining antibiotic therapies.

For clinical labs, education is a key factor in working with clinicians to ensure correct and appropriate use of PCT tests, Aloisio advised. "Clinicians who frequently request laboratory tests outside of their field of expertise lack the knowledge base to order the appropriate test and to correctly interpret its results," she said. "Conversely, clinical laboratory professionals, combining clinical knowledge with experience in the performance of laboratory assays, have the unique expertise to advise their clinical colleagues about the appropriate test selection and interpretation of laboratory results."

Preliminary discussions with laboratory professionals about PCT best practices could help preserve the cost-benefit by avoiding unnecessary testing, Aloisio said. In the paper, she and her colleagues recommended that labs limit unrestricted PCT testing to intensive care units as a decisionmaking tool in antibiotic regimens. "For all other clinical wards, the laboratory should guide PCT requests and give them support towards the most appropriate approach to testing," Aloisio and her colleagues wrote.