INFECTION

New biomarkers to identify septicemia and necrotizing enterocolitis in preterm neonates

Apolipoprotein CII and serum amyloid A (host-response biomarkers) might be useful for the early identification of septicemia and necrotizing enterocolitis in preterm neonates, a study in Hong Kong has found.

Preterm neonates are prone to potentially life-threatening infections and necrotizing enterocolitis. However, the symptoms are often nonspecific and inconspicuous, making diagnosis of these conditions difficult. In addition, “diagnosis of sepsis in preterm neonates is always hindered by the availability of enough blood for reliable test results,” explains corresponding author Terence Poon, “therefore, false negative results are common.”

To identify new biomarkers for

“This strategy identifies neonates who do not need antibiotic treatment...”

septicemia and necrotizing enterocolitis the investigators developed a study design with a biomarker discovery stage ($n = 74$), an independent case-control validation stage ($n = 80$) and a prospective cohort validation stage ($n = 104$). Mass

spectrometry-based proteomic profiling was used in the discovery stage to identify potential biomarkers. Plasma samples from the preterm neonates were then used to validate the potential biomarkers.

The researchers found that apolipoprotein CII and serum amyloid A were “enormously useful for identifying neonatal septicemia and necrotizing enterocolitis at a very early phase of infection.” To enable timely diagnosis in the hospital setting they then used immunoassay concentrations of the two biomarkers to construct an equation for calculating the ‘ApoSAA’ score—a diagnostic score for the identification of septicemia and necrotizing enterocolitis within 2 days of suspected clinical presentation.

The ApoSAA score also enabled the investigators to devise a novel triage strategy to classify neonates suspected of having septicemia or necrotizing enterocolitis into three risk category groups. This strategy identifies neonates who do not need antibiotic treatment, and enables discontinuation of treatment once an ApoSAA score < 0.119 is achieved. Multicenter trials are required to confirm this strategy, but Poon states

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that “[it] might preclude 61% of the true negative cases from receiving antibiotics unnecessarily or with very early stoppage of treatment.” Efficient use of antibiotics in preterm neonates is particularly important, as “prolonged antibiotic treatment could increase the risk of necrotizing enterocolitis.”

The researchers now plan to identify noninvasive biomarkers and improve their triage strategy to enable treatments to be given promptly to preterm neonates with septicemia or necrotizing enterocolitis.

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Original article Ng, P.C. et al. Host-response biomarkers for diagnosis of late-onset septicemia and necrotizing enterocolitis in preterm infants. *J. Clin. Invest.* doi:10.1172/JCI40196