MedicalXpress

New prognostic tool accurately predicts mortality risk in pediatric septic shock

January 29 2014

Researchers have developed a tool that allows caregivers to quickly and accurately predict the risk of death in children with septic shock – a systemic infection that damages vital organs and one of the leading causes of death among hospitalized children.

Reporting their results Jan. 29 in *PLOS ONE* (published by the Public Library of Science), researchers say the study validates a tool that would let doctors decide much faster which severely sick children need to receive aggressive life-saving therapy.

The multi-institutional study was led by Hector Wong, MD, Director, Division of Critical Care Medicine at Cincinnati Children's Hospital Medical Center, and Christopher Lindsell, PhD, Department of Emergency Medicine at the University of Cincinnati College of Medicine.

"Understanding the risk of mortality at an early time point is fundamental for clinical practice and clinical research. Without this objective information, we have nothing concrete to help us guide decisions on which patients need the most aggressive treatment," Wong said.

"The tool is useful for more than just making decisions on individual patients. It could be used to help decide which patients could benefit from being enrolled into clinical trials, as well as to measure the quality of care, he added. "If a patient that is predicted not to do well survives, it

is a marker that the treatment worked. The ability to estimate outcome risk is absolutely critical to all of these objectives."

The researchers have named the diagnostic tool PERSEVERE. It measures five biomarkers (proteins that can be measured in blood samples) and combines this with information about the patient to estimate the probability the child won't survive the illness. Based on their earlier research, which included extensive genetic screening and analysis, the researchers said detection of the biomarkers serves as a highly sensitive indicator of severity.

In a previous multi-institutional study, the researchers tested an earlier version of the tool involving 355 patients in pediatric intensive care units. They were able to validate the tool's diagnostic capabilities in that study, but decided additional research and development were needed to verify the tool works as expected in a wide range of children.

In the current study, the authors tested the tool on a new group of 182 pediatric patients from the intensive care units of 17 pediatric institutions. The diverse group of study participants from age 1 to 13 years covered a wide range of different conditions and illness severity. All were tested within 24 hours of admission to intensive care.

The tool showed that children who tested positive for high-risk sepsis had a 34 percent chance of not surviving, but those children who tested negative had only a 3 percent chance of dying. The authors also showed that children who tested positive for high-risk sepsis but survived the infection (21 percent of study patients) had greater degrees of organ failure and longer stays in the intensive care unit. The researchers said that the treatments received for their sepsis was probably reason these patients survived even though the test showed they were at very high risk.

As a follow up to the current study, Wong said the research team continues to study and advance development of the diagnostic tool to facilitate its routine use in critical care in children, and to see if it works in adults. Wong and the Cincinnati Children's Hospital Research Foundation (with Lindsell named as a co-inventor) have submitted a provisional patent application for PERSEVERE. Other authors in the study had no competing interests to report.

Provided by Cincinnati Children's Hospital Medical Center